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New reports of mayflies (Insecta: Ephemeroptera) from Tunisia

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New reports of mayflies (Insecta: Ephemeroptera) from Tunisia. - Four species of Ephemeroptera are recorded for the first time from Tunisia: *Sparbarus kabyliensis* (Caenidae), *Habrophlebia consiglioi* (Leptophlebiidae), *Nigrobaetis rhithralis* and *Procloeon stagnicola* (Baetidae). The genus *Nigrobaetis* is mentioned for the first time from Tunisia; *H. consiglioi* is reported for the first time from North Africa and is not an endemic to Sardinia. All these species were collected in streams located in Northern Tunisia. The eggs of *Sparbarus kabyliensis* are described for the first time.

Keywords: Ephemeroptera - *Habrophlebia consiglioi* - *Sparbarus kabyliensis* - *Procloeon stagnicola* - *Nigrobaetis rhithralis* - eggs - Northern Tunisia.

INTRODUCTION

Important advances in the knowledge of Ephemeroptera from North Africa were made recently, especially from Algeria and Morocco. A checklist of mayflies from North Africa is provided by Thomas (1998) and encompasses 69 species and 3 subspecies, with 21 named and 5 unnamed species listed from Tunisia. Only one species has been described from this country: *Baetis punicus* (Thomas *et al*., 1983).

Investigations led by the first author in several regions of North Tunisia made new collections available. The identification of the specimens was done in the laboratory of Hydrobiology in the Faculty of Sciences of Bizerta (Tunisia) and in the Museum of zoology in Lausanne (Switzerland).

MATERIAL AND METHODS

The study area covers the most important streams located in northern Tunisia (Fig. 1; Table 1). The samples were collected by means of a sieve and a net having a mesh size of 0.3mm in shallow areas of the various running waters. The mayflies were preserved in alcohol solution (70%). For detailed examination, some were dissected

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under the stereo microscope and were mounted on slides in Canadian balsam after a short stay in Creosote solution.

The eggs of Ephemeroptera show a great variability of morphological patterns, which have been used to solve taxonomic problems and to establish systematic relationships (Koss & Edmunds, 1974; Gaino *et al.*, 2001).

Egg procedure for Scanning Electronic Microscope study was as following: dehydrated in increasing concentrations of ethanol (80%, 90%, 95%) until absolute ethanol. Eggs mounted, sputter coated with gold-palladium and finally examined with JSM-6300F scanning electron microscope with working voltages of 5 KV (Ubero-Pascal & Puig, 2007).

Most of the material is deposited in the Laboratory of Environment Bio-monitoring in Jarzouna, Tunisia, with vouchers specimens housed in the Museum of zoology, Lausanne, Switzerland.

TABLE 1. Geographic coordinates and altitude of different studied sites.

	Sites	Coordinates	Alt. (m)
1	Joumine	36.96262N 9.52446E	90
2	Ziatine	37.19808N 9.22550E	7
3	Béja	36.76083N 9.19439E	176
4	Lasfer	36.77294N 8.77205E	484
5	Bransia	36.78105N 8.75175E	588
6	Mrij	36.75168N 8.69082E	577
7	Labgâa	36.74951N 8.69700E	563
8	Berbeg	36.74968N 8.69693E	558
9	Mouagène	36.48532N 8.30560E	714
10	Ennour	36.80072N 8.65871E	418
11	Ellil	36.72023N 8.73394E	237
12	Bouhertma	36.63460N 8.93201E	130
13	Edmen	36.72349N 8.69127E	631
14	Amor amont	36.92177N 8.74051E	12
15	Amor aval	36.92844N 8.75577E	3
16	Kébir	36.91899N 8.75425E	9
17	Ksar Mezouar	36.78287N 9.33666E	236
18	Lâarima	36.80060N 9.20833E	382
19	Maleh	37.10629N 9.54025E	16
20	Kloufi	37.19621N 9.58537E	2
21	Zaouit Magaiz	36.94437N 10.88759E	16
22	Abid	36.86725N 10.72477E	2
23	Chiba	36.71993N 10.73466E	94
24	Rennagha	36.85997N 8.72096E	58
25	El Mâadene	36.97006N 9.08503E	38
26	Ghzéla	36.64313N 8.69852E	229

SYSTEMATICS

Family Caenidae

Sparbarus kabyliensis (Soldán, 1986)

Brachycercus kabyliensis Soldán, 1986
Brachycercus sp.: Dakki & El Agbani, 1983
Brachycercus sp.: Zrelli *et al.*, 2006

MATERIAL EXAMINED: Loc. 1 (Joumine 24-X-2005).

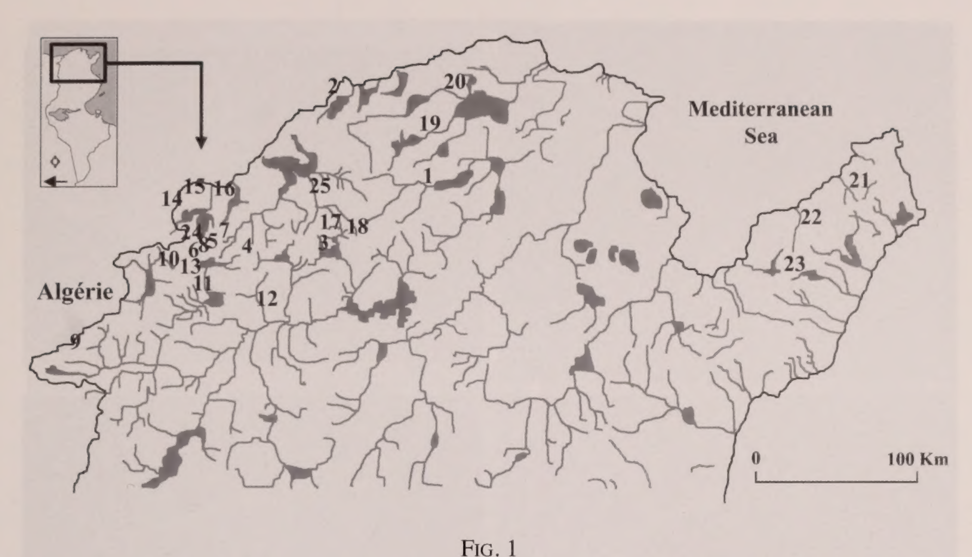


FIG. 1
Map of the study area showing the different prospected sites: Numbers according to table 1

REMARKS: A recent worldwide revision of the subfamily Brachycercinae by Sun & McCafferty (2008), allows us to reconsider the former identification of some nymphs attributed to the genus *Brachycercus* Curtis, 1835. Our material is in perfect accordance with the diagnosis and characters of *Sparbarus*. In peculiar, our specimens lack a posteromedial process at the base of the operculate gills, as well as operculate gills with ventral submarginal rows, but without a longitudinal ridge in the sublateral area nor a protruding edge at the posterolateral corner. In *Brachycercus*, abdominal tergum II has a process at the base of the operculate gills; the posterolateral corner of the operculate gills is distinctly more developed than the posteromedial corner.

Egg morphology: Length about 200µm. Shape elongate-ovate (Figs 2-3). Polar cap about one-third length of entire egg, without tubercles. Two linear micropyles per egg and a chorion with about 12 broad costae in lateral half (Figs 4-5).

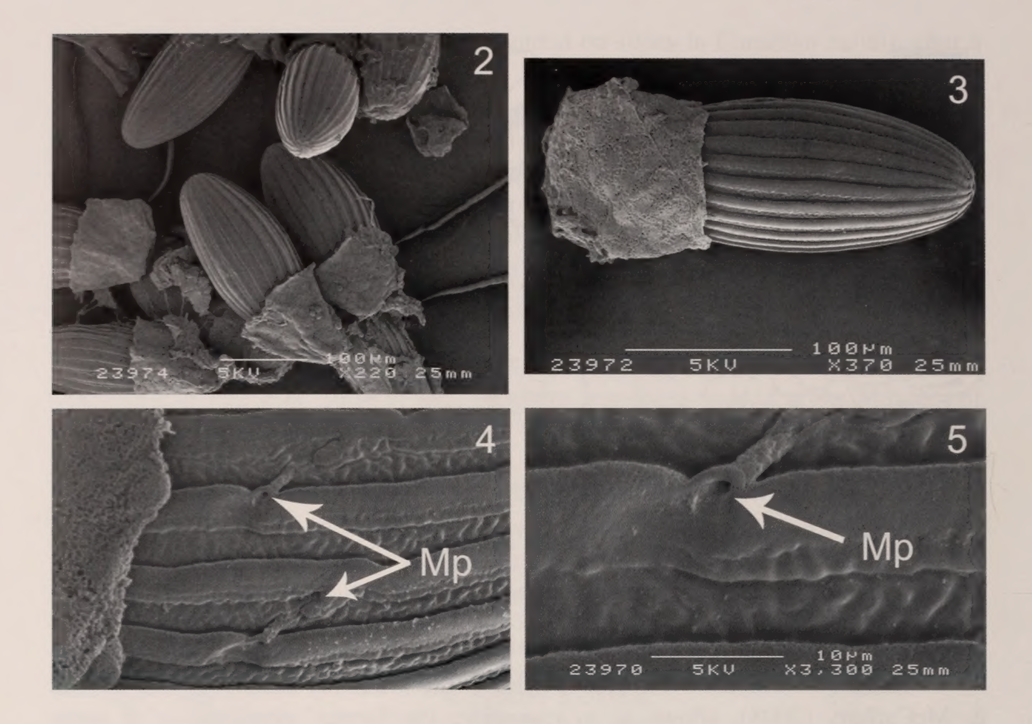
This species was first described from Algeria (Soldán, 1986), but was already mentioned from Morocco by Dakki & El Agbani (1983); and later from Tunisia by Zrelli *et al*. (006). The distribution of *Sparbarus kabyliensis* is restricted to a maritime humid zone of North Africa (Gagneur & Thomas, 1988). In Tunisia, this species is very rare and has been sampled in a single stream in North Tunisia, the Joumine stream (main tributary of the Ichkeul lake) situated at 90m a.s.l. This species is the only Brachycercinae so far known from North Africa.

Family Leptophlebiidae

Habrophlebia consiglioi Biancheri, 1959

Habrophlebia sp.: Boumaiza & Thomas, 1986
Habrophlebia sp.: Thomas, 1998

MATERIAL EXAMINED: loc. 4 (Lasfer 30-IV-2006). – loc. 5 (Bransia 24-V-2005). – loc. 6 (Mrij 25-V-2005). – loc. 8 (Berbeg 24-V-2005). – loc. 9 (Mouagène 29-VI-2005). – loc. 10



FIGS 2-5

Sparbarus kabyliensis (2) Cluster of eggs (3) General aspect of egg (4) Details of chorionic surface of egg. (5) Detail of micropyle (Mp).

(Ennour 24-V-2005, 28-VI-2005). – loc. 13 (Edmen 15-V-2005). – loc. 18 (Lâarima 25-IV-2009). – loc. 24 (Rennagha 30-IV-2006). – loc. 25 (El Mâadene 30-IV-2006).

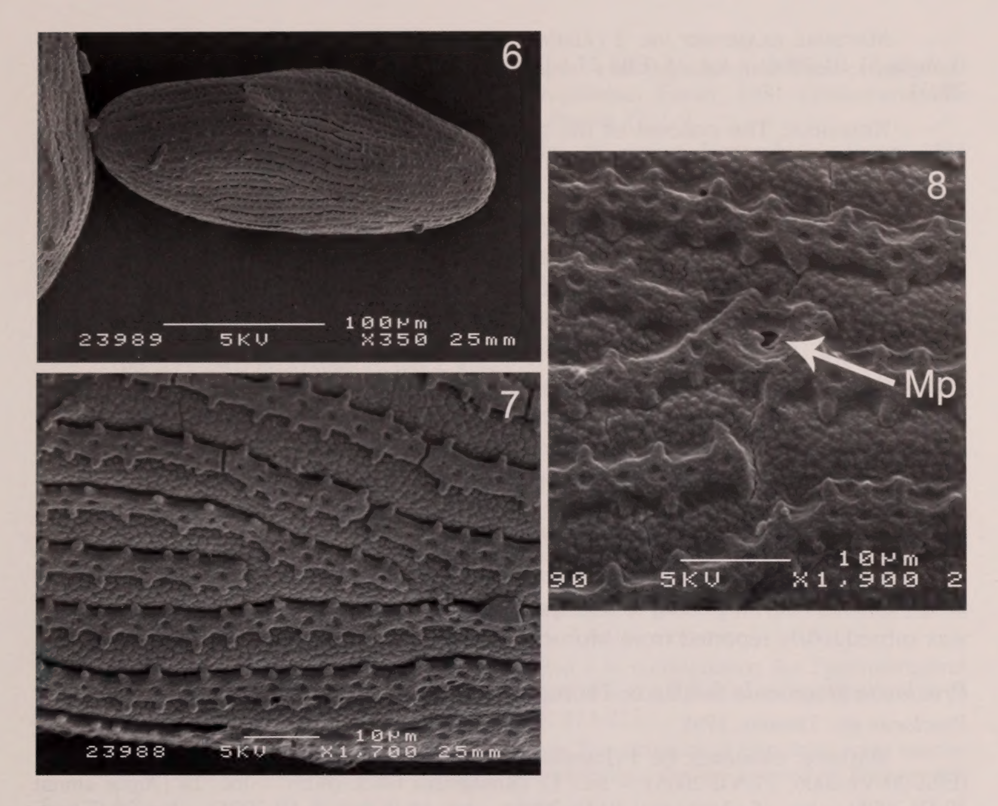
REMARKS: The genus *Habrophlebia* includes six West Palearctic species (Alba-Tercedor, 2000), and is represented in North Africa by two of them: *H. fusca* (Curtis, 1834) and *H. vaillantorum* Thomas, 1986 (Thomas *et al*., 1999).

In Morocco, two species are recorded, *H. fusca* and *H. vaillantorum*. In Algeria, only *H. fusca* is known, and in Tunisia this genus is represented by *Habrophlebia* sp. and *H. fusca* but this latter record by Kraiem (1986) is probably erroneous (see Thomas, 1998 for complete references therein).

Habrophlebia consiglioi can be distinguished from *H. fusca* and *H. lauta* as follows: in *H. consiglioi* nymphs, teeth on the posterior margin of the abdominal terga are of triangular shape, whereas such teeth are quadrangular in *H. fusca*. Dorsal face of femur with setae pointed and feathered in *H. consiglioi*, contrary to *H. lauta* where they are blunt and entire (Belfiore & Gaino, 1984).

Larvae of *H. consiglioi* are also distinguished by the gills baring a small number of filaments in the ventral lamella (1-3) and in the dorsal lamella (3-6) contrary to *H. eldae* for which the number of filaments is respectively (3-5) and (5-11).

Our investigations of the egg morphology (Figs 6-8) indicates that chorionic structure of the Tunisian specimens is similar to those from Sardinia (Mazzini &



FIGS 6-8
Habrophlebia consiglioi. (6) Overall view of the egg. (7) Detail of chorionic surface of egg with costae showing pores. (8) Detail of micropyle (Mp)

Gaino, 1985), bringing further arguments, besides the similarity of the larvae, for the conspecificity of both populations.

The discovery of *H. consiglioi* in Tunisia is of major importance. This is not only the first report of the species in North Africa, but it proves that the species is not endemic to Sardinia as previously thought (Buffagni *et al.*, 2003). To our knowledge, this is the first time such a distribution (Sardinia-Tunisia) is mentioned for circum Mediterranean mayflies. At the moment, we have no information allowing us to decide if *H. consiglioi* originated from Sardinia and colonized subsequently Tunisia, or the contrary as recently shown for some reptiles (Carranza *et al.*, 2008).

All populations of *H. consiglioi* in Tunisia are restricted to streams of the Northwest area.

Family Baetidae

Nigrobaetis rhithralis (Soldán & Thomas, 1983)

Baetis rhithralis Soldán & Thomas, 1983
Diphetor rhithralis: Waltz *et al.*, 1994
Nigrobaetis rhithralis: Lugo-Ortiz & de Moor, 2000
Baetis rhithralis: Jacob, 2003

MATERIAL EXAMINED: loc. 2 (Ziatine 30 IV 06). – loc. 3 (Béja 27-III-2006). – loc. 7 (Labgâa 31-III-2006). – loc. 11 (Ellil 27-VII-2005, 30-IV-2006). – loc. 17 (Ksar Mezouar 24-X-2005).

REMARKS: The concept of the genus *Nigrobaetis* is discussed by Waltz *et al.* (1994) and Gattolliat (2004). Thirty one species are known with 14 in the Palearctic region (Waltz *et al.*, 1994; Waltz & McCafferty, 1997; Lugo-Ortiz & de Moor, 2000).

The generic attribution of *Nigrobaetis rhithralis* was subject of several changes. It does not belong to *Diphetor* as cited by El Alami *et al.* (2000) because it lacks the distinctive bifid prostheca of the right mandible characteristic of that genus (Lugo-Ortiz & de Moor, 2000). The distribution of *Diphetor* is restricted to the North of the Nearctic area (Lugo-Ortiz & de Moor, 2000). Müller-Liebenau (1969) divided the genus *Baetis* in several species groups, a part of them subsequently raised to sub-generic or generic level. The attempt of Jacob (2003) to gather again genera such as *Nigrobaetis*, *Alainites* and *Labiobaetis* into *Baetis* is no more tenable as Müller-Liebenau's concept of *Baetis* has been proven to be highly polyphyletic (Monaghan *et al.*, 2005; Gattolliat & Sartori, 2008). *Nigrobaetis rhithralis* perfectly matches the concept of *Nigrobaetis* as defined in Waltz *et al.* (1994).

The presence of the genus *Nigrobaetis* (first record) and the species *N. rhithralis* in Tunisia is not surprising as this species was originally described from Algeria and was subsequently reported from Morocco (El Alami *et al.*, 2000).

Procloeon stagnicola Soldán & Thomas, 1983

Procloeon sp.: Thomas, 1998

MATERIAL EXAMINED: loc 1 (Joumine 06-IV-2009). – loc. 3 (Béja 27-III-2006). – loc. 11 (Ellil 30-VI-2006, 27-VII-2005). – loc. 12 (Bouhertma 04-X-2005). – loc. 14 (Amor amont 30-IV-2006). – loc. 15 (Amor aval 30-IV-2006). – loc. 16 (Kébir 28-VI-2005). – loc. 20 (Kloufi 26-II-2006). – loc. 21 (Zaouit El Magaîz 09-II-2006). – loc. 22 (Abid 27 IV 06). – loc. 23 (Chiba 27-IV-2006). – loc. 26 (Ghzéala 30-V-2005).

REMARKS: In North African region, the genus *Procloeon* is represented by three species: *P. concinnum* Eaton, 1885, *P. pennulatum* (Eaton, 1870), *P. stagnicola* Soldán & Thomas, 1983. Boumaiza & Thomas (1995) mentioned the presence of this genus in Tunisia but without specific attribution.

Several larvae belonging to the genus *Procloeon* were included in the material collected in many streams of northern watersheds of Tunisia. Based on the morphological characters such as the presence of lateral spines on abdominal segments VI to IX, the shape of the gills and the absence of hindwings, specimens were assigned to *Procloeon stagnicola* (Soldán & Thomas, 1983).

It constitutes the first record of this species from Tunisian running waters, and also the first mention since its original description from Algeria.

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The first author is grateful to all the members of Museum of Zoology in Lausanne for hosting her to conduct stage research within their laboratory; special thanks to Pascale Derleth for her encouragements and advices.

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Pseudoblothrus infernus sp. n. (Pseudoscorpiones, Syarinidae) from the Hölloch cave (Schwyz, Switzerland), with new records of *Pseudoblothrus strinatii* Vachon from Switzerland and France

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Pseudoblothrus infernus sp. n. (Pseudoscorpiones, Syarinidae) from the Hölloch cave (Schwyz, Switzerland), with new records of *Pseudoblothrus strinatii* Vachon from Switzerland and France. - The new species *Pseudoblothrus infernus* n. sp. is described from the Hölloch cave in the canton of Schwyz, Switzerland. It is the third species of this genus recorded from this country. New records are given for *Pseudoblothrus strinatii* Vachon, found in caves of the Jura Mountains of Switzerland (canton of Neuchâtel) and in France (Doubs department).

Keywords: Biospeleology - taxonomy.

INTRODUCTION

The Pseudoscorpion family Syarinidae is represented in Europe by four genera, two of which (*Pseudoblothrus* Beier and *Hadoblothrus* Beier) are strictly troglobiont and considered to be thermophilous relict forms of the Tertiary (Beier, 1970; Strinati, 1966). Nine *Pseudoblothrus* species have been described from caves in Italy, Portugal (Azores Archipelago), Switzerland and Ukraine. In Switzerland, *Pseudoblothrus strinatii* Vachon has been recorded from four caves of the Jura Mountains (cantons of Neuchâtel and Jura), and a second species, *Pseudoblothrus thiebaudi* Vachon, from two caves in the Alps (cantons of Bern and Vaud).

Dr Ulrich Jörin (Zurich) first sent me a photograph of a pseudoscorpion collected in the Hölloch cave ("Hell's Hole"; canton of Schwyz) representing almost certainly a *Pseudoblothrus* species. The study of the specimen confirmed the generic position and revealed a new species described below. The Hölloch is one of the most frequently visited caves in Switzerland, one of the biggest caves in the world, with about 200 km of galleries and corridors, extending to a depth of more than 900 m. Despite intensive speleological exploration, knowledge of its fauna is fragmentary and no true troglobiont arachnid species has yet been recorded. The occurrence of this pseudoscorpion species is therefore surprising, since it seems to be more related to *P. strinatii* from caves in the Jura Mts than to *P. thiebaudi* from two geographically closer caves in the Alps (Vachon, 1969). Its close relationship with *P. strinatii* can be compared with the geographical distribution of two troglobiontic insect species (*Lito-campa (=Plusiocampa) sollaudi* (Denis), Diplura, Campodeidae, and *Pseudosinella vandeli relicta* Gisin, Collembola, Entomobryidae) which are considered by Strinati

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(1966) and Stomp (1977) as thermophilous relicts whose ancestors invaded subterranean habitats during the great glaciations.

MATERIAL AND METHODS

The specimen was mounted on a temporary slide, in glycerine, and studied under a Nikon Optiphot compound microscope, drawings were done with a Nikon drawing tube. The specimen and dissected parts (legs I and IV, pedipalp, chelicera) are conserved together in alcohol. Trichobothrial nomenclature follows Chamberlin (1931).

All studied specimens are deposited in the collections of the Muséum d'histoire naturelle, Geneva, Switzerland (MHNG, without registration number).

DESCRIPTIONS

Pseudoblothrus strinatii Vachon

NEW RECORDS: MHNG, Switzerland, Jura Mountains, Boudry (canton of Neuchâtel), source de Combe-Garot, gorges de l'Areuse, 533 m a.s.l., found in a water filtrating net; 8.IX.1985, leg. P. Moeschler: 1 protonymph. – MHNG, France, Département Doubs, Chenecey-Buillon, gouffre des Granges-Mathieu, piège; 18.VIII.1968, leg. H. Colin: 1 tritonymph.

REMARKS: The "source de Combe-Garot" is also where the harpactoid *Gelyella monardi* Moeschler & Rouch, 1988 (Crustacea) was collected, again by water filtration. Since the protonymph of *P. strinatii* is undescribed, specific identification is based on geographical considerations.

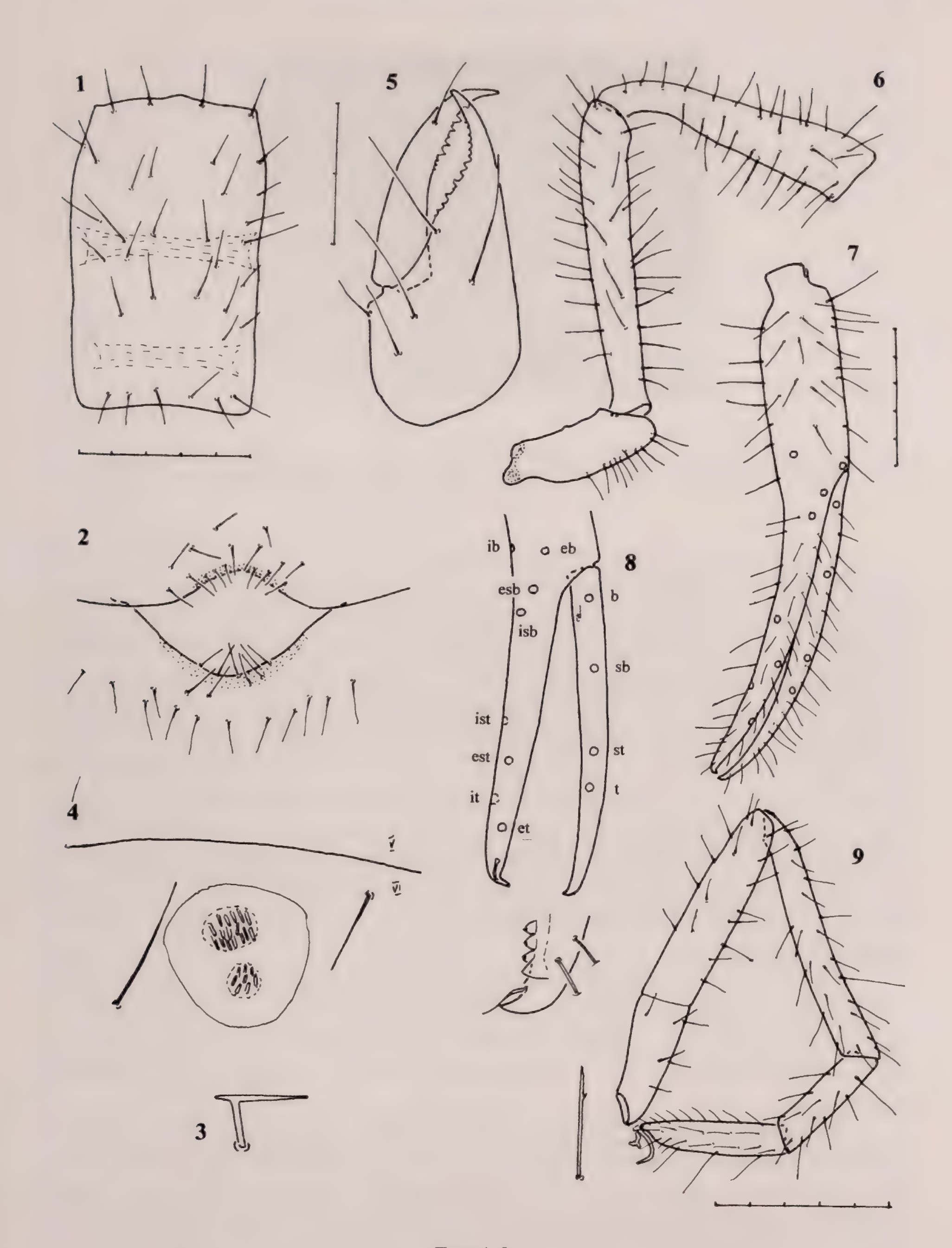
Three males from the cave "Grand creux de Montfaucon (cave BE 37 in Strinati, 1966) show the following proportions of pedipalpal patella and chela (with pedicel): patella 4.2-4.7 times longer than broad (0.89-1.00 mm/0.21 mm), chela with pedicel 5.6-5.9 times longer than broad (1.65-1.86 mm/0.29-0.31 mm), finger 1.4-1.5 times longer than hand with pedicel. These proportions are more slender than those indicated for the holotype from the Grotte de Pertuis (Strinati, 1966: cave NE 26 by Vachon, 1957). All three males possess three patches of glandular setae in their ventral gland.

Pseudoblothrus infernus sp. n. Figs 1-9

SPECIMEN EXAMINED: MHNG; holotype 1♂; Switzerland, canton of Schwyz, Muotathal, Hölloch (Strinati, 1966: SZ 1), carstic corridor named "Konsummeile", ("substrats de sable et limon, mouillé"), near waste of old bivouac ("près d'un dépôt de dechets (20 m) d'un bivouac": U. Jörin, in litt.), 1500 m from entrance, 200 m depth; 27.12.2009, leg. U. Jörin & M. Pulfer.

DIAGNOSIS: The presence, in the male, of ventral glands on sternite VI and the smooth pedipalpal femur and hand places *P. infernus* sp. n. close to *P. strinatii*. The new species differs by the morphology of the ventral glands (only two patches of glandular setae vs three in *strinatii*), the number of setae on anterior margin of cephalothorax (4 vs 6 in *strinatii*) and by the more slender pedipalpal chela (6.4 times longer than broad vs 5.5-5.9 times in *strinatii*). Ventral glands are absent in *P. thiebaudi* Vachon.

DESCRIPTION: Cephalothorax and pedipalps reddish brown, tergites I and II large, brown, the following narrower, yelowish.



FIGS 1-9

Pseudoblothrus infernus sp. n., ♂ holotype. (1) Cephalothorax. (2) Sternites II (anterior genital operculum) and III. (3) Teratological lateral seta of sternite V. (4) Ventral gland on sternite VI. (5) Left chelicera. (6-7) Left pedipalp. (8) Trichobothrial pattern, with details of tip of movable finger (higher magnification). (9) Left leg IV, with subterminal seta (higher magnification). Scale units 0.1 mm.



FIG. 10
Pseudoblothrus infernus sp. n., holotype, alive; copyright Dr Ulrich Jörin, Zurich.

Cephalothorax (Fig. 1) 1.6 times longer than broad, without eyes or eyespots, with two distinct tranverse furrows, the subbasal one narrower; middle of anterior margin broadly rounded: 33 setae (4 at anterior, 6 at posterior margin). Chaetotaxy of tergites I-XI: 5-9-10-10-13-12-13-13-8(2 lateral, 2 sublateral tactile setae)-7(4 tactile setae); manducatory lobe with 1(right) or 2(left) setae, pedipalpal coxa smooth, 7-8 setae, coxa I 5, II 7-8, III 2-3, IV 7-8; anterior genital operculum with 16 setae (6 median marginal setae) (Fig. 2), genital chamber with 2 unmodified setae, sternite III: 12 + 6 median discal setae + 4 suprastigmal setae, IV 12 + 7 median discal setae + 4 suprastigmal setae, V 15 + 6 median discal setae (one lateral seta abnormal, T-shaped: Fig. 3; a similar teratology was described for a sternophorid pseudoscorpion from Dominican amber: Judson, 1998), VI 16 + ventral gland + 2 median discal setae, VII 16, VIII 16, IX 14, X 14, XI 12 (4 tactile setae); anal cone 2+2 setae; ventral gland (Fig. 4) in a round central depression on sternite VI, with two patches of glandular tubules (17/8).

Chelicera (Fig. 5) with 5 long setae on hand, fixed finger with 13 pointed teeth, the distal ones smaller, movable finger with 10 pointed teeth of varying length, subgaleal seta reaching tip of finger, spinneret absent, serrula exterior with 23, serrula interior with 16 lamellae, rallum composed of six setae, apparently only the distal one finely dentate.

Pedipalps (Figs 6-8) smooth, trochanter 3.0 times longer than broad, with a tiny button-like ventral tubercle, femur indistinctly club-shaped, 6.4 times, patella 4.5 times longer than broad, pedicel short, hand cylindrical, with pedicel 2.5 times longer than broad, chela with pedicel 6.4 times, without pedicel 6.1 times longer than broad; finger 1.6 times longer than hand with pedicel, fixed finger with 94 small pointed teeth, movable finger with about 88 small teeth, only the 15 distal ones pointed, distalmost tooth of row large and more lateral, venom duct in fixed finger very short. Trichobothrial pattern similar to that of *P. strinatii* and *P. thiebaudi*, *ib* slightly basal to *eb*, *esb* slightly nearer to *isb* than to *eb*, the four distal trichobothria equidistant from each other; a small sensillum distal of *b*.

Leg I: femur 5.6 times longer than deep and 1.8 times longer than patella, the latter 3.3 times longer than deep, tibia 6.4 times, basitarsus 4.1 times, telotarsus 6.0 times longer than deep and 1.3 times longer than basitarsus; leg IV (Fig. 9): femur+ patella 6.0 times longer than deep, tibia 7.5 times, basitarsus 4.3 times, telotarsus 3.9 times longer than deep and 1.1 times longer than basitarsus; no distinct tactile setae present; subterminal seta finely dentate, arolia undivided and distinctly shorter than the thin and smooth claws.

Measurements (length/depth in mm): total length 2.4; cephalothorax 0.87/0.53; pedipalps: trochanter 0.55/0.18, femur 1.10/0.17, patella 0.98/0.22, pedicel 0.24, hand with pedicel 0.71/0.29, pedicel 0.07, finger length 1.15, chela length with pedicel 1.82; leg I: femur 0.58/0.10, patella 0.32/0.10, tibia 0.46/0.07, basitarsus 0.27/0.07, telotarsus 0.34/0.06; leg IV: femur+patella 0.92/0.15, tibia 0.74/0.10, basitarsus 0.36/0.08, telotarsus 0.41/0.10.

ETYMOLOGIE: The species epithet is a Latin adjective, meaning belonging to (or coming from) the underworld.

ACKNOWLEDGEMENTS

My sincere thanks go to Dr Ulrich Jörin for providing the specimen of the new species and for his permission to publish the photograph. I am also indebted to Dr Claude Besuchet and Mr Pascal Moeschler (Muséum d'histoire naturelle, Geneva) who, years ago, gave me specimens of *Pseudoblothrus strinatii*. Dr Pierre Strinati (Cologny) helped with bibliographic research. I thank also an unnamed referee and Dr Peter Schwendinger (Muséum d'histoire naturelle, Geneva) for valuable comments and linguistic improvements.

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REVUE SUISSE DE ZOOLOGIE 118 (1): 17-29; mars 2011

New records of pseudoscorpions from the Juan Fernandez Islands (Chile), with the description of a new genus and three new species of Chernetidae (Arachnida: Pseudoscorpiones).

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New records of pseudoscorpions from the Juan Fernandez Islands (Chile), with the description of a new genus and three new species of Chernetidae (Arachnida: Pseudoscorpiones). - The new genus *Selacho - chernes* gen. n. with the type species *S. allodentatus* sp. n. (♂ only) is described from Masatierra. The new genus is characterized by a rallum of 4 setae, the absence of a tactile seta on tarsus of leg IV, the very unusual dentition of the chelal fingers and the presence of only 3 trichobothria on the movable chelal finger. *Chelanops gracilipes* sp. n. and *Chelanops gracili- palpus* sp. n. are described from Masatierra. *Neocheiridium tenuisetosum* Beier, 1959 is recorded from this archipelago for the first time, *Lechytia kuscheli* Beier, 1957 is briefly redescribed. Additional records are given for species previously recorded from the Juan Fernandez Islands.

Keywords: *Selachochernes* - *Chelanops* - *Neocheiridium* - taxonomy.

INTRODUCTION

The pseudoscorpion fauna of the Juan Fernandez Islands (Chile) has previously been known from Beier's (1955, 1957) publications based on the collections constituted by Rev. Dr G. Kuschel. Eleven species were recorded from Masatierra (8 species) and from Masafuera (4 species), one of them being common to both islands. Most genera and species are endemic to the archipelago, only one species (*Parazaona* sp.) seems to be introduced (found in a house). The genus *Stigmachernes* Beier, 1957 was subsequently synonymized by Muchmore (1999) with *Chelanops* Gervais, 1849.

Years ago, Dr T. Kronestedt (Stockholm) sent me for study, together with other South American material, some specimens from Juan Fernandez Islands (Masatierra) collected by K. Bäckström during the Swedish Pacific Expedition of 1916/17, and by C. Skottsberg in 1955/56. Additionally, the late Prof. F. di Castri had sent to the Muséum d'histoire naturelle, Genève, the pseudoscorpion collection of the late Dr V. Vitali-di Castri with partly identified samples from different localities on mainland Chile. Amongst the unidentified pseudoscorpions, I came across a small collection made by Prof. H. Franz (Vienna) during his stay on Masatierra in 1968, which includes already recorded species, but also a new genus and two new species. The origin of these samples could be identified with the help of Ch. Hörweg (Vienna), who sent me copies of the hand-written lists of H. Franz.

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The Vitali-di Castri collection also included material sent on loan to her by the National Museum of Natural History, Budapest, Hungary (type specimens and species from Argentina collected by Gy. Topal in 1961 and published by Beier, 1964b), which has now been returned to Budapest (Dr S. Mahunka). Type specimens collected by G. Kuschel in Chile (Beier, 1964a) and on Juan Fernandez Islands (Beier, 1955, 1957) have been returned to the Naturhistorisches Museum, Vienna (Austria) (Mag. Ch. Hörweg), whence it had probably been obtained on loan.

Unfortunately, most samples in the Vitali-di Castri collection do not have precise labels, only codes, without accompanying explanatory notes. Some codes concerning samples from mainland Chile could be deciphered, but the major part awaits such clarification, the codes corresponding probably to field numbers of ecological surveys carried out by F. di Castri in different regions of Chile.

The holo- and paratypes of the new species are deposited in the Muséum d'histoire naturelle Genève, Switzerland (MHNG, without registration number).

Terminology of the trichobothria follows Chamberlin (1931). Length/breadth ratio is given for pedipalpal segments in dorsal view, except for chelal hand and chela in Chthoniidae, where a length/depth ratio is given, because that was measured in lateral view.

ABBREVIATIONS

T… tritonymph; D… deutonymph; P… protonymph;

MHNG Muséum d'histoire naturelle, Genève (Switzerland)
NHMW Naturhistorisches Museum, Wien (Austria)
NRMS Naturhistoriska Riksmuseet Stockholm (Sweden)
S.P.E. Swedish Pacific Expedition

LIST OF IDENTIFIED SPECIES ALREADY KNOWN FROM THE ARCHIPELAGO

Lechytia kuscheli Beier, 1957

MATERIAL STUDIED: MHNG, 1 ♀; Juan Fernandez Is., Masatierra, forest above Puerto Ingles, 14.XI.1968, leg. H. Franz (Sa 197-198). – MHNG, 1 P; Juan Fernandez Is., ex coll.V.Vitali-di Castri (OT-2).

REMARKS: The species is known from different localities on Masatierra; the unique female is characterized as follows. Cephalothorax as long as broad (0.40 mm/0.40 mm); pedipalpal femur 4.3 times longer than broad (0.42 mm/0.10 mm) and 2.0 times longer than patella, which is 1.8 times longer than broad (0.21 mm/0.12 mm); hand 1.7 times longer than deep (0.27 mm/0.16 mm), chela 4.0 times longer than deep (length 0.63 mm); finger 1.5 times (length 0.39 mm) longer than hand. Chelal fingers with about 36 low and partly indistinct teeth (their canals still visible in tooth lamella); apical seta of pedipalpal coxa simple, apex sinoid; coxa of leg I with a pointed anterior projection.

Muchmore (1975) distinguished two groups in the genus *Lechytia* by the form of the apical seta on the pedipalpal coxa, which is either furcate (e.g. *L. sini* Muchmore, *arborea* Muchmore, *chthoniiformis* Balzan) or simple (e.g. *L. hoffi* Muchmore, *L. kuscheli*, and *L. chilensis* Beier).

Geogarypus bucculentus Beier, 1955

MATERIAL STUDIED: NRMS, 1 T; Masatierra, under bark, S.P.E. no. 443, 3.IV.1917, leg. K. Bäckström. – MHNG, 3♂ 2♀ 4T; Masatierra, forest above Juan Bautista, leg. H. Franz (SA 186).

Neocheiridium tenuisetosum Beier, 1959

MATERIAL STUDIED: NRMS, 1♀; Masatierra, without date and exact locality, leg. K. Bäckström (S.P.E.).

SHORT DESCRIPTION: Setae of carapace fine, acute and usually simple, those of tergites slightly longer, acute, curved, partly with a tiny tooth; cephalothorax broader than long (0.40 mm/0.51 mm); chelicerae: rallum with 4 setae, distal one large, velum-like; pedipalps: trochanter 1.55 times longer than broad (0.20 mm/0.13 mm), femur 5.15 times (0.46 mm/0.09 mm), patella 3.5 times (0.37 mm/0.11 mm), hand with pedicel 2.1 times longer than broad and 1.9 times longer than finger, length of finger 0.19 mm, chela with pedicel 3.2 times longer than broad (length 0.50 mm): 5 + 1 trichobothria on chelal fingers, each finger with 7 cusped teeth distally. Leg I: femur+ patella 4.0 times longer than deep (0.27 mm/0.07 mm), tibia 3.1 times (0.18 mm/0.06 mm), tarsus 4.6 times longer than deep (0.19 mm/0.04 mm); leg IV: femur+patella 5.1 times longer than deep (0.37 mm/0.07 mm), tibia 4.7 times (0.26 mm/0.06 mm), tarsus 5.6 times (0.25 mm/0.04 mm) longer than deep.

This is the first record of this species since its description from Argentina (Bariloche, Rio Negro), hence it represents a new element for the fauna of the Juan Fernandez Islands.

Asterochernes vittatus Beier, 1955

MATERIAL STUDIED: MHNG, 1P 1D; Juan Fernandez Islands, without data, ex coll. Vitali-di Castri (JF-66-I; OTS-1-A). - MHNG; 2T 1D; Masatierra, forest above Puerto Ingles, 14.XI.1968, leg. H. Franz (SA 197-198).

REMARK: No adult female of this species was available, I show therefore the spermatheca of *Asterochernes kuscheli* Beier from mainland Chile (Fig. 23).

Chelanops insularis Beier, 1955

MATERIAL STUDIED: NRMS, 1♀; Masatierra, under bark, 10.I.1917, leg. K. Bäckström (S.E.P. 218). - NRMS; 1♂ 1♀ 9T 3D 2P; under bark, 3.IV.1917, leg. K. Bäckström (S.E.P. 443); 1T 2P, without data, leg. K. Bäckström (S.E.P.). – NRMS; 1T 1D; El Pangal, above waterfall, 1956, leg. C. Skottsberg. – NRMS, 1♀; Valle Anson, 400 m, 18.III.1966, leg. C. Skottsberg. - NRMS, 1 D, El Yunque, 800 m, 6.III.1955, leg. C. Skottsberg. – MHNG, 5♀ 1T 7D 26P, Masatierra, forest above Puerto Ingles, 14.XI.1968, leg. H. Franz (SA 197-198).

Chelanops kuscheli Beier, 1955

MATERIAL STUDIED: NRSM, 1 T; Masatierra, Valle Anson, 400 m, (2nd label in vial: Camate, 500 m, 28.XII.1954), 18.III.1955, leg. C. Skottsberg. – MHNG, 1 D; Juan Fernandez Islands, without data, ex coll.Vitali-di Castri (JF-118 I). – MHNG, 1 P; Masatierra, Valle Lord Anson, 11.XI.1968, leg. H. Franz (SA 191). – MHNG, 1 P; forest above Puerto Ingles, 14.XI.1968, leg. H. Franz (SA 197-198).

Pseudopilanus fernandezianus Beier, 1957

MATERIAL STUDIED: MHNG, 1 T; Juan Fernandez Islands, without data, ex coll. Vitali-di Castri (OT-27).

REMARKS: The specimen fits well to the description given by Beier (1957). Examination of the holotype confirms the presence of a rallum composed of three setae (right chelicera; left chelicera is lacking), the trichobothrial pattern and the presence of spine-like setae on medial face of chelal hand; on the right chelal hand there is only one long spine-like seta near the finger base instead of three on the left one (Beier, 1957, fig. 2). There are 27 teeth on the fixed chelal finger, 30 teeth on the movable finger, the teeth are small, densely set, retrorse, with a small cusp. The venom duct in the movable finger is long, the nodus ramosus is situated halfway between *t* and *st*.

DESCRIPTIONS

Selachochernes gen. n.

DIAGNOSIS: Member of Chernetidae, Chernetinae.Tegument normally sclerotized, vestitural setae of cephalothorax, tergites and pedipalps short and strongly clavate. Cephalothorax with two eyespots, two indistinct transverse furrows, the subbasal one much nearer to posterior margin than to median furrow; most tergites divided, XI without tactile setae. Chelicera with 5 simple setae on hand; galea short, with 4 apical/subapical branchlets, rallum with 4 setae, the distal one dentate on anterior margin. Pedipalps heavily granulate, the strongly clavate setae of femur and patella inserted on coarser granula, distal setae on hand less clavate, fixed finger at base and on dorsal face with two long and stout setae; fixed chelal finger in distal half with acute, spaced teeth followed by lower, retrorse, cusped teeth, accessory teeth present on antiaxial face: the spaced marginal teeth and the accessory teeth forming two rows of teeth (like shark teeth); movable finger distally with slightly spaced teeth; long venom duct present in movable finger only. Trichobothria: 8 on fixed finger, *est-ib-isb* in middle of finger (near strong seta), *ist* forming a group with *it-et*; movable finger: 3 trichobothria (probably *sb* lacking). Leg IV: tarsus without tactile seta, arolia undivided, claws smooth.

TYPE SPECIES: *Selachochernes allodentatus* sp. n.

DISTRIBUTION: Chile, Juan Fernandez Islands (Masatierra).

ETYMOLOGY: From the Greek noun „selachos“ (cartilaginous fish, shark, ray), referring to the unusual, shark-like arrangement of teeth on the fixed chelal finger.

AFFINITIES: Within the Chernetinae with a rallum of four setae, *Selachochernes* gen. n. is quite isolated and characterized at once by the particular trichobothrial pattern on the fixed finger (*ib* and *isb* distinctly distal of *eb-esb* opposite *est*) and the reduced number of trichobothria on the movable finger. By the presence of strongly clavate and a few long, stout setae on the chela it resembles *Pseudopilanus* Beier (type species *fernandezianus* Beier), but that genus differs in having a rallum of 3 setae, trichobothria *ib-isb* basal near *eb-esb*, and the chelal teeth numerous and closely set (27 on fixed, 30 on movable finger). For further evaluation of importance of some taxonomic characters see the following remarks. Since spermathecae of *Pseudopilanus* species from Chile are unrecorded, at least that of *P. kuscheli* from mainland Chile is shown (Fig. 22) as first step to a better knowledge of this genus.

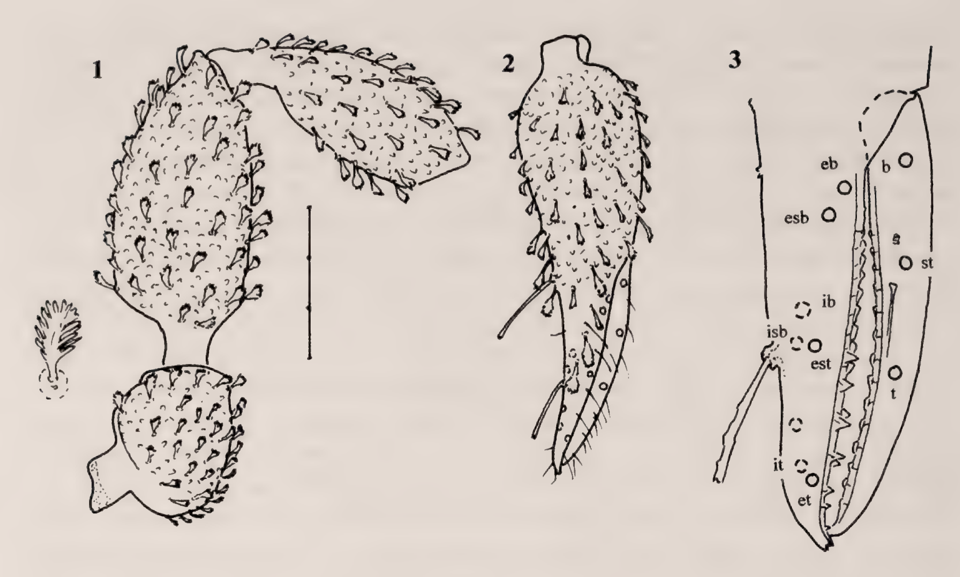
REMARKS: The presence of two superficially similar and not related genera in the Juan Fernandez archipelago might seem to be improbable, but the differences between *P. fernandezianus* and *S. allodentatus* sp. n. cannot be explained by possible

ontogenetic changes or variability of the one or the other taxonomic character (e.g. number of setae of rallum). Within a chernetid genus the number of setae of the rallum is relatively stable, variability is very unfrequent, the setae being frequently difficult to observe (particularly in case of a rallum with 4 setae, observation errors might therefore occur more frequently than natural variability); during ontogeny numbers of these setae are not changing from tritonymphs to adults, in Chernetidae at least. In the following species currently placed in *Pseudopilanus*, the rallum is composed of 3 setae (personal observations): *fernandezianus* (holotype), *kuscheli* (paratype), *chilensis* (syntype), *crassifemoratum* (holotype, paratype). Tooth morphology and arrangement on chelal finger are very similar (small, densely set, retrorse, cusped teeth) in *fernandezianus*, *chilensis* (syntypes: 39-41 teeth on fixed finger, 46 on movable finger), *kuscheli* (syntypes; 34-37 on fixed finger, 37-42 on movable finger), *crassifemoratum* (31 teeth on fixed, 32-33 teeth on movable finger). Tooth morphology is identical in tritonymph and adults (female, male) of *crassifemoratum*, an ontogenetic modification of tooth morphology from tritonymphal to adult stages in Chernetidae is unknown to me. Even in (slightly) sexual dimorphic species like *Pseudopilanus chilensis* (chelal finger of male in middle curved and therefore gaping when closed; those of female straigth and not gaping) no difference in tooth morphology or arrangement is observable. This is also the case in strongly dimorphic species like *Parachernes melanopygus* Beier or *Parachernes setiger* Mahnert (Chernetidae, both from Amazonia). Ontogenic changes cannot explain the fundamental difference in trichobothrial pattern found in *allodentatus* (*ist* in distal third of fixed finger and close to *it*, *ib-isb-est* grouped together in middle of finger, *eb-esb* isolated near finger base) and *fernandezianus* (*ib-isb* grouped with *eb-esb* near finger base, *est* in middle of finger), since the position of the trichobothria *ib-isb* compared to that of *eb-esb* and of *est* does not change much from tritonymph to adult stage, as far as documented in the literature. This latter pattern (*ist* indistinctly distal of *est* in middle of finger, *ib-isb* near finger base and distinctly basal of *est-ist*) is found in *P. chilensis*, and also in *kuscheli* and *crassifemoratum* (where *ist-est* are more basally placed), and it anticipates probably the pattern of adult *fernandezianus*. The presence of only three trichobothria in *S. allodentatus* might be variable and of importance on specific and not on generic level (e.g. in *Americhernes incertus* Mahnert from Amazonia). Furthermore, distribution of paraxial trichobothria on the fixed finger is considered of generic importance in Chernetidae (e.g. difference between the groups *Parachernes/Anaperochernes* and *Asterochernes/Parazaona*) (Beier, 1964a).

Selachochernes allodentatus sp. n. Figs 1-3

MATERIAL STUDIED: MHNG, holotype ♂; Chile, Juan Fernandez Islands, Masatierra, forest above Puerto Ingles, 14.XI.1968, leg. H. Franz (Sa 197-198).

DESCRIPTION: Cephalothorax 0.86 times longer than broad, granulate (granula small and regular, separated by equivalent of own diameter from each another), eyespots indistinct, 4 anterior and 6 posterior strongly clavate setae. Tergites I/II indistinctly divided, XI undivided, III-X divided, all densely granulate, chaetotaxy of half-tergites: 3-3-3-5-5-5-5-5-5-5-10(total number; 2 medial discal setae), IV-X including an anterolateral seta; manducatory process with 3 marginal and 1 discal setae, suboral



FIGS 1-3
Selachochernes allodentatus gen. n., sp. n., ♂ holotype. (1-2) Left pedipalp. (3) Trichobothrial pattern, with sensillum proximal to *st*. Scale units 0.1 mm.

seta (see Judson, 1998) very short; pedipalpal coxa coarsely granulate, about 40 setae, coxa I 19, II 24, III 36, IV 42, all setae simple, acute; genital operculum with about 34 setae arranged in a semi-circle, the inner ones long and curved; genital entrance with 2/2 short simple and curved setae. Sternites divided, chaetotaxy of half-sternites III-XI: 6+4 discal setae (no suprastigmal seta)-6+1 suprastigmal seta-8-9-8-6-6-5-2 (2 short median setae); anal cone 2+2 setae. Pleural membrane granulate, intersegmental membrane striate.

Chelicera: 5 smooth setae on hand, fixed finger with 3 retrorse teeth and 3 subapical granula, lamina exterior well developed, movable finger with cone-like subapical tooth, subapical seta not reaching tip of galea, short galea with 4 subapical and apical branchlets; serrula exterior with 16 lamellae, rallum of 4 setae, only distal one dentate.

Pedipalps (Figs 1-2) coarsely granulate, the broadly clavate setae on coarser granula, setae on hand more slender; trochanter with rounded dorsal hump, 1.6 times longer than broad, femur abruptly enlarged, 2.4 times, patella 2.8 times longer than broad, club 2 times longer than broad and 2.5 times longer than pedicel, hand with pedicel 1.9 times longer than broad and as long as finger, chela with pedicel 3.6 times longer than broad; one long stout seta on paraxial face of fixed finger base, another long stout seta on dorsal face of fixed finger near trichobothria *est/ist*. Fixed finger with 5 spaced acute teeth followed (basal of *est*) by 9 low, retrorse, densely set teeth, 3 antiaxial accessory teeth (or 3 laterally displaced marginal teeth?), movable finger with 4 high, rounded and 10 low, mostly rounded teeth, no accessory teeth present; venom duct long, nodus ramosus near trichobothrium *st*. Trichobothria (Fig. 3): movable finger with 3 trichobothria only (probably *sb* lacking).

Leg I: femur 1.8 times longer than deep, patella 2.7 times longer than deep and 1.4 times longer than femur, tibia 3.7 times and tarsus 5.3 times longer than deep; leg IV: femur+patella 4.0 times longer than deep, tibia 4.9 times and tarsus 5.7 times longer than deep; undivided arolia as long as smooth claws.

MEASUREMENTS (in mm): Body length 1.8; cephalothorax 0.59/0.69; pedipalps: trochanter 0.33/0.21, femur 0.59/0.24, patella 0.51/0.18, hand with pedicel 0.41/0.22, pedicel length 0.06, finger length 0.42, chela length 0.78; leg I: femur 0.19/0.11, patella 0.26/0.10, tibia 0.27/0.07, tarsus 0.28/0.05; leg IV: femur+patella 0.50/0.12, tibia 0.38/0.08, tarsus 0.33/0.06.

Chelanops gracilipes sp. n. Figs 4-8

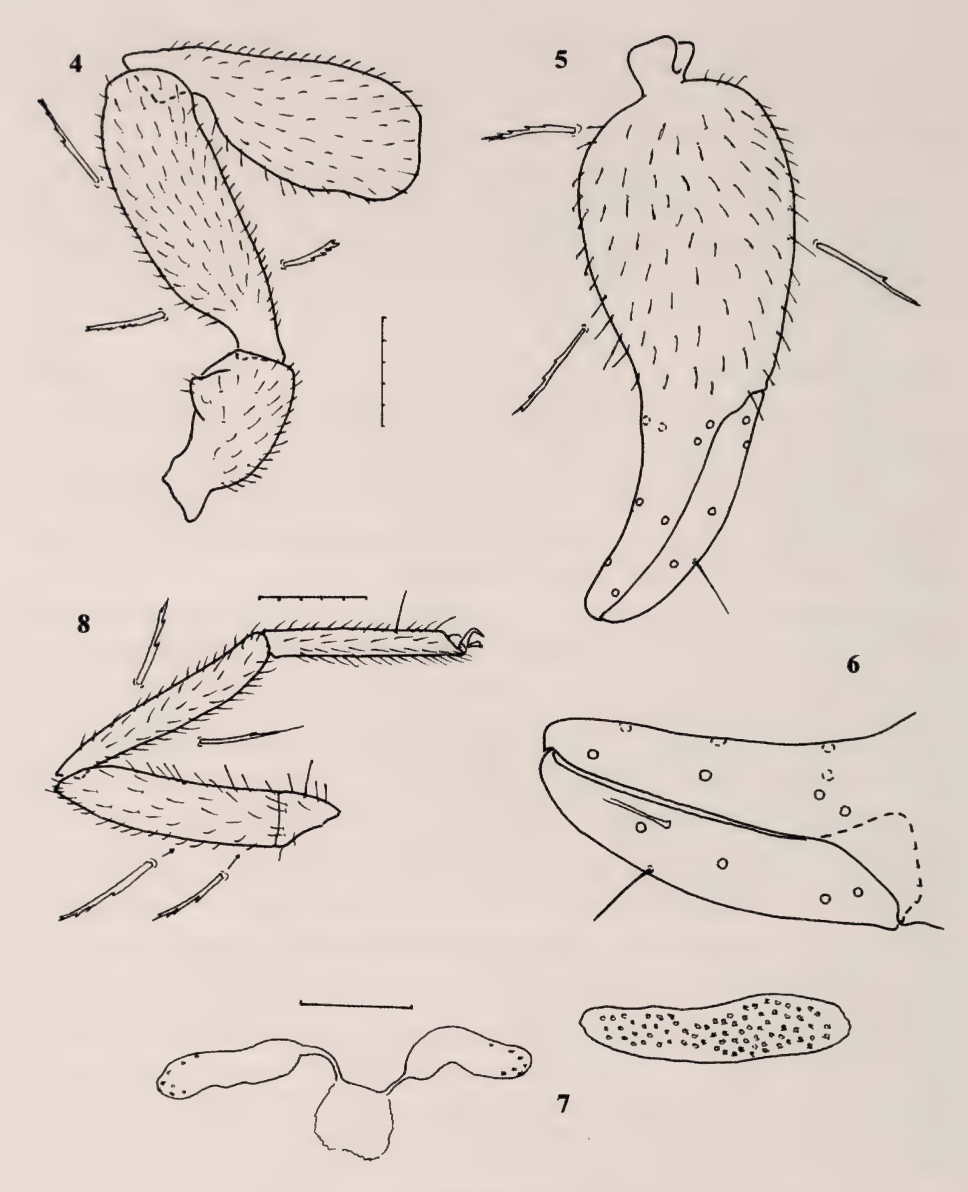
MATERIAL STUDIED: MHNG holotype ♀; Chile, Juan Fernandez Islands, Masatierra, forest above Puerto Ingles, 14.XI.1968, leg. H. Franz (Sa 197-198).

DIAGNOSIS: The new species is characterized by its large size (length of palpal femur 1.40 mm, length of chela 1.57 mm), by the chelal hand being only 1.3 times longer than finger, and the very slender legs (e.g. femur+patella of leg IV 5.2 times, tibia 6.7 times, tarsus 7.6 times longer than broad).

DESCRIPTION: Cephalothorax in anterior half reddish brown, basal half yellowish brown, pedipalps dark reddish brown, tergites brown. Cephalothorax 1.2 times longer than broad; no eyes or eyespots; laterally finely granulate, central part smooth; with two granulate transverse furrows, median furrow laterally curved forward, basal furrow narrower and situated halfway between median furrow and posterior margin; setae short, dentate and slightly clavate, 12 setae at posterior margin plus 17 in metazone; metazone with small central depression (groove). Tergites I-X distinctly divided, setae dentate and clavate, longer on posterior tergites, half-tergites with about 7 (6-9) setae on posterior margin, I-IV with 1 median, 1 lateral and 1 discal seta, V-X with 1 median seta, 1-2 lateral setae and 3-5 discal setae, XI with 16 setae (2 lateral tactile and 4 discal setae). Manducatory process with 3 marginal (suboral seta short) and 4 discal setae, coxae of legs with numerous setae. Spermatheca with paired tubes enlarged in distal two-thirds (Fig. 7); anterior genital operculum with about 40 smooth and acute setae; sternites divided, setae long, acute and finely dentate, chaetotaxy of half-sternites: III 11/12+3 suprastigmal setae, IV 7+1 suprastigmal seta, V-X 10+2 medial+1 lateral setae-12+2+1+2 discal setae-6+2+1+6-10+2+1+2-10+2+2+5-7+2+1+3; entire XI with 10 (2 lateral and 2 submedial tactile setae). Anal cone 2+2 setae.

Chelicera with 7 setae on hand, basal three dentate; fixed finger with 6 retrorse teeth, movable finger with tooth-like subapical lobe; galea long, with 6 apical/subapical curved branchlets; serrula exterior with 26 lamellae; rallum with 4 setae, anterior one dentate.

Pedipalps (Figs 4-5) rugose but not granulate, setae short, dentate and weakly clavate; trochanter with high dorsal hump, 1.8 times longer than broad, femur increasing in breadth distally, 3.1 times longer than broad, patella 2.5 times, club 1.8 times longer than broad and 2.5 times longer than pedicel, hand with pedicel 1.7 times longer than broad and 1.3 times longer than finger, chela with pedicel 2.8 times,



FIGS 4-8

Chelanops gracilipes sp. n., ♀ holotype. (4-5) Left pedipalp, setae of fingers omitted; with some vestitural setae at higher magnification. (6) Trichobothrial pattern. (7) Spermatheca with right cribrate plate (ventral view). (8) Left leg IV. Scale units 0.1 mm.

without pedicel 2.6 times longer than broad; finger 1.3 times longer than hand breadth, fingers not gaping when closed, fixed finger with 57 teeth plus 13 antiaxial (=lateral) and 6 paraxial (=medial) accessory teeth, movable finger with 60 teeth plus 11 antiaxial plus 6 paraxial accessory teeth; nodus ramosus in movable finger slightly

proximal to *t*. Trichobothria (Fig. 6): *est* opposite *ist* in middle of fixed finger, *it* proximal to *et* and nearer to finger tip than to *ist*; *st* on movable finger nearer to *t* than to *sb*.

Leg I: femur 1.65 times, patella 3.5 times longer than deep and 1.7 times longer than femur, tibia 5.4 times longer than deep and 1.1 times longer than tarsus, which is 7.15 times longer than deep; leg IV (Fig. 8): femur+patella 5.2 times, tibia 6.7 times longer than deep and 1.3 times longer than tarsus, tarsus 7.6 times longer than deep, tactile seta (length 0.19 mm) in distal half (TS=0.67); subterminal setae smooth, curved, claws smooth and longer than undivided arolia.

MEASUREMENTS (in mm): Body length 5.2; cephalothorax 1.35/1.16; pedipalps: trochanter 0.79/0.45, femur 1.40/0.45, patella 1.37/0.55, hand with pedicel 1.57/0.94, finger length 1.22, chela length with pedicel 2.58, without pedicel 2.41. Leg I: femur 0.42/0.25, patella 0.70/0.20, tibia 0.81/0.15, tarsus 0.73/0.10; leg IV: femur+patella 1.28/0.25, tibia 1.12/0.17, tarsus 0.87/0.11.

ETYMOLOGY: Latin noun meaning „slender leg“, emphasizing the slender legs.

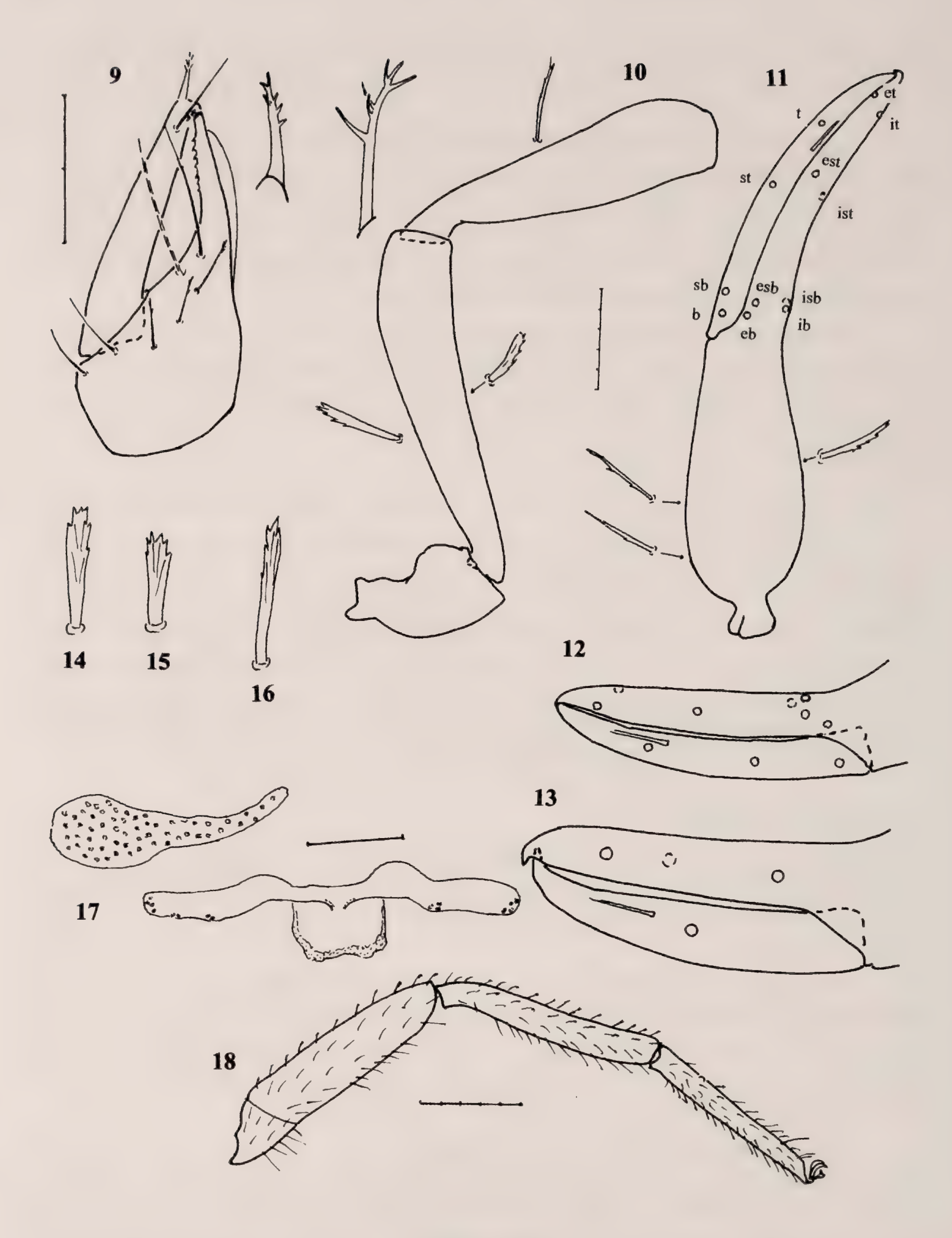
AFFINITIES: The new species seems to be related to *Chelanops kuscheli* Beier, and differs from it by the more slender legs (e.g. femur+patella IV 5.2 vs 3.7-3.8 times, tibia 6.65 vs 4.7-5 times longer than deep) and relatively longer palpal fingers. *Chelanops insularis* Beier (Juan Fernandez Islands, Masatierra) has distinctly longer chelal fingers which are, furthermore, strongly curved and slightly gaping when closed. *Chelanops atlanticus* Beier (from Tristan da Cunha) has similar slender legs, but is notably smaller (length of palpal femur 0.90 mm vs 1.40 mm), has a more slender chela (ratio 3.1-3.2 vs 2.8 times), and has trichobothrium *est* distal of *ist*.

Chelanops gracilipalpus sp. n. Figs 9-18

MATERIAL STUDIED: MHNG, holotype ♂; Chile, Juan Fernandez Islands, Masatierra, forest above Puerto Ingles, 14.XI.1968, leg. H. Franz (Sa 197-198). – MHNG, paratypes 1♂ 3♀ 3 trito-, 5 protonymphs; same data. – NHMW; paratype 1 T; Masatierra, Bahia Cumberland, 200 m, 23.XII.1955, leg. Dr G. Kuschel (recorded by Beier, 1957 as *Protowithius robustus* Beier).

DIAGNOSIS: The presence of accessory teeth on the chelal fingers, a rallum of four blades, the position of trichobothrium *ist* slightly proximal of *est*, and the presence of a short tactile seta in the distal third of tarsus IV places the species within the genus *Chelanops*. It is quite isolated within this genus by its very slender pedipalps (femur 4.5-5.0, patella 3.9-4.3, chela 4.5-4.9 times longer than broad).

DESCRIPTION: Cephalothorax and pedipalps brown, legs yellowish. Cephalothorax parallel-sided, 1.2 times longer than broad, finely granulate, prozone nearly smooth in central part; two transverse granulate furrows, subbasal one slightly closer to posterior margin than to median furrow; no eyes or eyespots; setae short, dentate and clavate, 7 on anterior margin, 14-18 setae on posterior margin and in metazone (Fig. 14). Tergites I-X divided, scaly sculptured, half-tergites mostly with 7-9 setae (Figs 15, 16) on posterior margin and 1 medial seta, from IV-X also with 1 lateral and 1 discal seta, XI with 12 setae (2 lateral tactile and 2 medial discal setae). Manducatory process with 3-4 marginal setae (suboral seta short) and 2 discal setae; pedipalpal



FIGS 9-18

Chelanops gracilipalpus sp. n. (9) Left chelicera of holotype ♂, with galea of ♂ (left) and ♀ (right) (higher magnification). (10-11) Left pedipalp of holotype ♂, vestitural setae omitted, some setae shown at higher magnification. (12) Trichobothrial pattern of tritonymph. (13) Trichobothrial pattern of protonymph. (14-16) Setae (higher magnification) on posterior border of cephalothorax (14), on tergite I (15) and on tergite XI (16). (17) Spermatheca with right cribrate plate (ventral view). (18) Left leg IV. Scale units 0.1 mm.

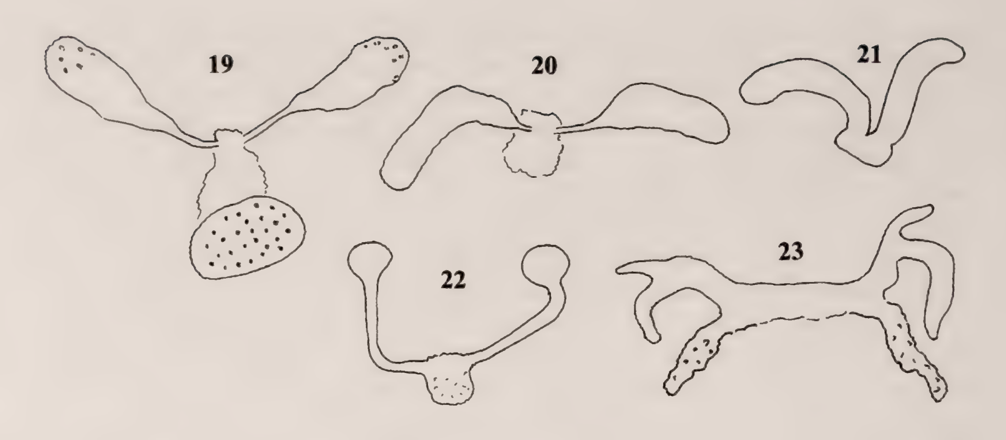
coxae smooth except for a granulate mediodistal zone, coxa I-IV with numerous acute, smooth setae. Male genital chamber with 4 acute setae on each side of entrance; female spermatheca (Fig. 17) with two sac-like tubules; anterior genital operculum of male with about 50 long, acute and curved setae in semi-circular arrangement, that of female with about 40 acute setae (Fig. 17); chaetotaxy of half-sternites: III 9 setae at posterior margin+13 discal setae+4 suprastigmal setae (♂) (♀: 14+4 suprastigmal setae), IV 6-8+1-2 suprastigmal setae, V-IX mostly 8-9 (-11) setae,1-2 medial, 1 lateral and 1 discal setae, X 6-7+2+1+4, entire XI 10 (2 lateral and 2 submedial tactile setae). Anal cone 2+2 (dorsal ones clavate, ventral ones dentate). Pleural membrane granulate.

Chelicera (Fig. 9) with 7 (right chelicera with 6) setae, among them 3 interno-basal setae with dentate apex, fixed finger with 6-7 retrorse teeth and 3 apical granules, movable finger with tooth-like subapical lobe; galea of male shorter than that of female, with 6 short branchlets, that of female slender, with six long branchlets in distal half; serrula exterior with 24-26 lamellae, rallum composed of 4 dentate setae of decreasing lengths.

Pedipalps (Figs 10-11): femur and hand finely granulate, patella rugose, nearly smooth; setae dentate and indistinctly clavate on paraxial side of femur; trochanter with large dorsal hump, 1.9-2.2 times longer than broad, femur club-shaped (distally broadest), 4.8-5.0 (♂)/4.5-4.8 (♀) times, patella 4.1-4.3 (♂)/3.9-4.2 (♀) times longer than broad, club 3.3-3.5 (♂)/3.0-3.1 (♀) times longer than broad, hand with pedicel 2.5 (♂)/2.2-2.5 (♀) times, chela with pedicel 4.9 (♂)/4.5-4.8 (♀) times, without pedicel 4.6 (♂)/4.2-4.5 (♀) times longer than broad, finger 1.1 times longer than hand with pedicel. Fixed finger with a large series of cone-like sensilla in paraxial basal third, with 90-96 small cusped marginal teeth, with 15-19 antiaxial and 3-6 paraxial accessory teeth; movable finger: 92-100 marginal teeth, 12-17 antiaxial and 1-3 paraxial accessory teeth; venom duct present in movable finger only, nodus ramosus nearer to *t* than to *st*; trichobothria arrangement (Fig. 11) with a basal group (*eb-esb-ib-isb*), *ist*/*est* in distal half of fixed finger, *ist* slightly proximal of *est*, *it*/*et* near fingertip; *st* nearer to *t* than to *sb*.

Leg I: femur 1.8-1.9 times longer than deep, patella 3.9-4.4 times longer than deep and 1.8-1.9 times longer than femur, tibia 6.4-7.1 times and tarsus 7.6-8.5 times longer than deep; leg IV (Fig. 18): femur+patella 5.2-5.3 times, tibia 7.1-7.9 times and tarsus 7.3-9.1 times longer than deep, latter with a short tacile seta (lenght 0.16-0.19 mm) in distal third (TS=0.64-0.77), undivided arolia shorter than smooth claws, subterminal seta smooth, curved.

Measurements (in mm): Body length 3.1-3.6 (♂)/4.3-4.6 (♀); cephalothorax 1.21-1.25/1.00-1.07 (♂) (♀ 1.34/1.07-1.11); pedipalps: trochanter 0.74-0.83/0.39-0.40 (♂) (♀ 0.82-0.90/0.40-0.43), femur 1.66-1.72/0.34-0.35 (♂) (♀ 1.69-1.71/0.35-0.39), patella 1.57-1.59/0.37-0.38 (♂) (♀ 1.60-1.62/0.39-0.41), hand with pedicel 1.40/0.56 (♂) (♀ 1.46-1.54/0.62-0.66), finger length 1.50-1.53 (♂) (♀ 1.59-1.67), chela length with pedicel 2.73-2.74 (♂) (♀ 2.91-2.96), without pedicel 2.56-2.58 (♂) (♀ 2.75-2.80). Leg I: femur 0.42-0.45/0.22-0.25, patella 0.76-0.82/0.18-0.19, tibia 0.84-0.85/0.13 (♂) (♀ 0.88-0.90/0.13), tarsus 0.78-0.85/0.10-0.11; leg IV: femur+patella 1.29-1.32/0.25 (♂) (♀ 1.36-1.37/0.26-0.27), tibia 1.11-1.14/0.15-0.16 (♂) (♀ 1.17-1.20/0.15-0.16), tarsus 0.95-0.99/0.11 (♂) (♀ 0.99-1.03/0.11-0.12)



FIGS 19-23

Spermathecae (ventral view). (19) *Chelanops insularis* (S.E.P. 218). (20) *Chelanops kuscheli* (S.E.P. 218). (21) *Chelanops skottsbergi* (Masatierra, La Correspondencia). (22) *Pseudopilanus kuscheli* (Santiago de Chile). (23) *Asterochernes kuscheli* Beier (allotype).

Tritonymph (1 specimen): Half-tergites with 6-7 setae on posterior margin, on posterior half-tergites also 1 medial, 1 lateral and 1 discal seta; chelicera with 6 setae on hand, two basal ones dentate, galea slender with 3 apical and 2 subapical branchlets. Chela 4.6 times longer than broad (1.99 mm/0.43 mm) (no other measurements taken), fixed finger with 71 cusped marginal teeth, 12 antiaxial and 2 paraxial accessory teeth, movable finger with 72 teeth, 5 antiaxial and 1 paraxial teeth; nodus ramosus proximal of trichobothrium *t* (Fig. 12).

Protonymph (1 specimen): Half-tergites with 3 setae on posterior margin; chelicera with 4 smooth setae on hand, galea long, with 2 apical and 1 subapical branchlets. Chela 4.2 times longer than broad (0.87 mm/0.21 mm), fixed finger with 29 marginal teeth (13 distal ones cusped, the following rounded) and 1 distal antiaxial accessory tooth; movable finger with 13 cusped teeth and 23 rounded ones; nodus ramosus distal of trichobothrium *t* (Fig. 13).

ETYMOLOGY: Latin noun, meaning „slender pedipalp".

DISCUSSION: *Chelanops gracilipalpus* sp. n. is unique within the genus *Chelanops* by its very slender pedipalps. It might have affinities with *Chelanops insularis* (from Masatierra) and *Chelanops skottsbergi* (Beier) (from Masatierra and Masafuera) (see also Fig. 21: spermatheca), which also have a club-shaped palpal femur and relatively long chelal fingers. In spite of the very divergent proportions and measurement, I do not have any doubts concerning its generic placement, even if there are other discrepancies between the diagnosis of the genus *Chelanops* given by Muchmore (1999) and the new species (as well as the other *Chelanops* species from Juan Fernandez Islands): a long, erect tactile seta in the distal half of tarsus IV (here a short tactile seta, merely longer than depth of tarsus); spermatheca having 2 slender tubes of uniform diameter (here two sac-like distal parts with thin basal tubes). These differences do not allow, in my opinion, to place these species in a different genus.

Muchmore (1999) described the spermatheca of *C. coecus* as „occasionally seen as 2 slender tubes of uniform diameter", and with a long erect tactile seta on tarsus IV. Several females which I identified as *C. coecus* from Argentina and Chile showed a spermatheca of the same form as that figured for *gracilipalpus* (and similar to those of *kuscheli* and *insularis*) (Figs 19, 20). Since the spermatheca is delicate and difficult to observe in the large abdomen, the description of the spermatheca given by Muchmore needs to be verified. The long tactile seta seems to break off easily, but I have never observed for *C. coecus* a short tactile seta as present in *gracilipalpus*, *gracilipes*, *insularis* and *kuscheli*.

The new species is superficially similar to *Protowithius robustus* Beier, and Beier (1957) himself confused a tritonymph of *C. gracilipalpus* sp. n. with *P. robustus*. Besides the major family differences between Chernetidae and Withiidae, *Chelanops gracilipalpus* sp. n. is distinguishable at once from *P. robustus* by its larger size (length of palpal femur 1.66-1.72 mm vs 1.27 mm), more slender pedipalpal patella (ratio 3.9-4.3 vs 2.8), more slender legs, and its trichobothrial pattern (*ist* proximal of *est*, both in middle of the fixed finger, *et* near finger tip, *ist* halfway between *it* and *isb*).

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A new *Eudorylas* Aczél, 1940 from Central Asia (Diptera: Pipunculidae)

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A new *Eudorylas* Aczél, 1940 from Central Asia (Diptera: Pipunculidae). - *Eudorylas manasi* Kehlmaier sp. n. is described from a specimen collected in the eastern part of the Kyrgyz Republic. The male holotype and its genitalia are figured. The species is briefly compared to other members of the *Eudorylas fascipes* species group of the Palaearctic and incorporated in an existing identification key. The pipunculid species presently recorded from the Kyrgyz Republic are listed.

Keywords: Diptera - Pipunculidae - *Eudorylas* - new species - Kyrgyz Republic - Palaearctic.

INTRODUCTION

Pipunculidae, commonly known as big-headed flies, are traditionally being considered a taxonomic difficult group of cyclorrhaphan Diptera. However, substantial progress could be achieved during the last three decades with many genera or tribes being systematically revised on a regional or world scale. Whereas in the mid 1980s some 700 species were known (Skevington & De Meyer, 2004), this number now stands at 1.400 (Skevington, unpublished database). The rise in species numbers is due to fact that authors set their focus on A) regions previously neglected, and B) the structure of the male genital apparatus as the main and in many instances sole feature for identifying and separating species (besides the increasing importance of DNA barcodes). Today, this knowledge of the suitability of different genital features for species circumscription is well-grounded and, based on a specialist's expertise, also allows the erection of new taxa based on singletons only. In the case of the Eudorylini, it is the structure of the phallic guide, phallus and surstyli which essentially are necessary for the identification of a specimen.

MATERIAL AND METHODS

The material was collected by Dr. Valery A. Korneyev (Kiev) and Dr. Bernhard Merz (Geneva) and subsequently deposited at the Muséum d'Histoire Naturelle Genève (MHNG).

The descriptive part, including morphological terminology and drawings, follows previous works (Kehlmaier, 2005a, 2005b). However, in contrast to the terms 'inner' and 'outer' previously applied to differentiate between the position of surstyli,

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gonopods and sides of the epandrium, the terms 'left' and 'right' are used in accordance with Skevington (e.g. 2001, 2002), representing the actual morphological location of these structures.

The following ratios and abbreviations are used in the descriptive part of the study: LF:WF – length of flagellum to its width; F:EM:V – frons length to length of eyes meeting to vertex length; LW:MWW – length of wing to max. width of wing; LS:LTC – length of pterostigma to length of third costal segment; LTC:LFC – length of third costal segment to length of fourth costal segment; MLE:MWE – max. length of epandrium to max. width of epandrium (viewed dorsally).

TAXONOMIC RESULTS

Eudorylas manasi Kehlmaier sp. n.

TYPE MATERIAL: Holotype, ♂, Kyrgyz Republic, Sary Dzhaz River Basin, Kayingdy Kattah Mountain Ridge, 41°57'34.14"N 79°8'7.01"E, 2550–2600m, 8.VII.1994, leg. V. Korneyev, coll. MHNG.

LOCUS TYPICUS: The specimen was collected in the eastern most part of the country in the Sary Dzhaz River Basin in the Kayingdy Kattah Mountain Ridge which belongs to the Central Tien Shan Mountains. The locality can be characterized as a dry steppe with maximum day temperatures at 16–21°C and stony or poor soils. Vegetation is composed of few Gramineae grasses, some *Artemisia*, *Aster*, *Limonium*, *Saussurea*, *Youngia* plus willow shrubs (*Salix*) and birches (*Betula*) along streams (Korneyev pers. comm.).

ETYMOLOGY: The taxon is named after the eponymous hero of the Epic of Manas, a traditional poem of the Kyrgyz people consisting of approximately 500.000 lines. Besides, Manasi is also a Hindi female forename.

DESCRIPTION (Male)

Body length: About 3.9 mm.

Head (Figs 1–2): Face dark, silver-grey pollinose. Scape dark, with one short upper bristle. Pedicel dark, with two short upper bristles and one short lower bristle. Flagellum dark yellow, tapering and grey pollinose (LF:WF=2.6). Arista dark, flattened, with thickened base. Eyes meeting for 13 facets. F:EM:V=1:1.1:0.8. Frons dark, silver-grey pollinose. Vertex dark, lacking pollinosity. Occiput dark and grey pollinose, but with a whiff of faint brownish pollinosity intermingled in upper half.

Thorax (Figs 1–2): Pleura, prescutum, scutum and scutellum dark. Pleura grey pollinose. Postpronotal lobe yellow, weakly grey pollinose and with four postpronotal hairs along upper margin. Prescutum and scutum narrowly grey pollinose in anterior quarter, posterior fifth and narrowly along lateral margins, otherwise brown pollinose and with two uniseriate dorsocentral rows of hair and some supra-alar hairs. Scutellum dorsocentrally brown pollinose, otherwise grey pollinose and with approximately ten hairs along posterior margin (up to 0.06 mm). Subscutellum silver-grey pollinose.

Wing: Length: 4.5 mm. LW:MWW=3.9. Wing almost entirely covered with microtrichia. Only small basal cells of wing, e.g., bc, basal quarter of c, very beginning of r1 and middle part of sc with microtrichia absent or reduced. Pterostigma complete (LS:LTC=1.0). LTC:LFC=1.1. r-m reaches dm shortly before one third of the cell's length. M1 gently undulating.

FIG. 1
Left lateral view of male holotype of *E. manasi* sp. n.



FIG. 2
Right dorsolateral view of head and thorax of male holotype of *E. manasi* sp. n.

Halter: Length: 0.5 mm. Base and knob dark. Stem narrowly white.

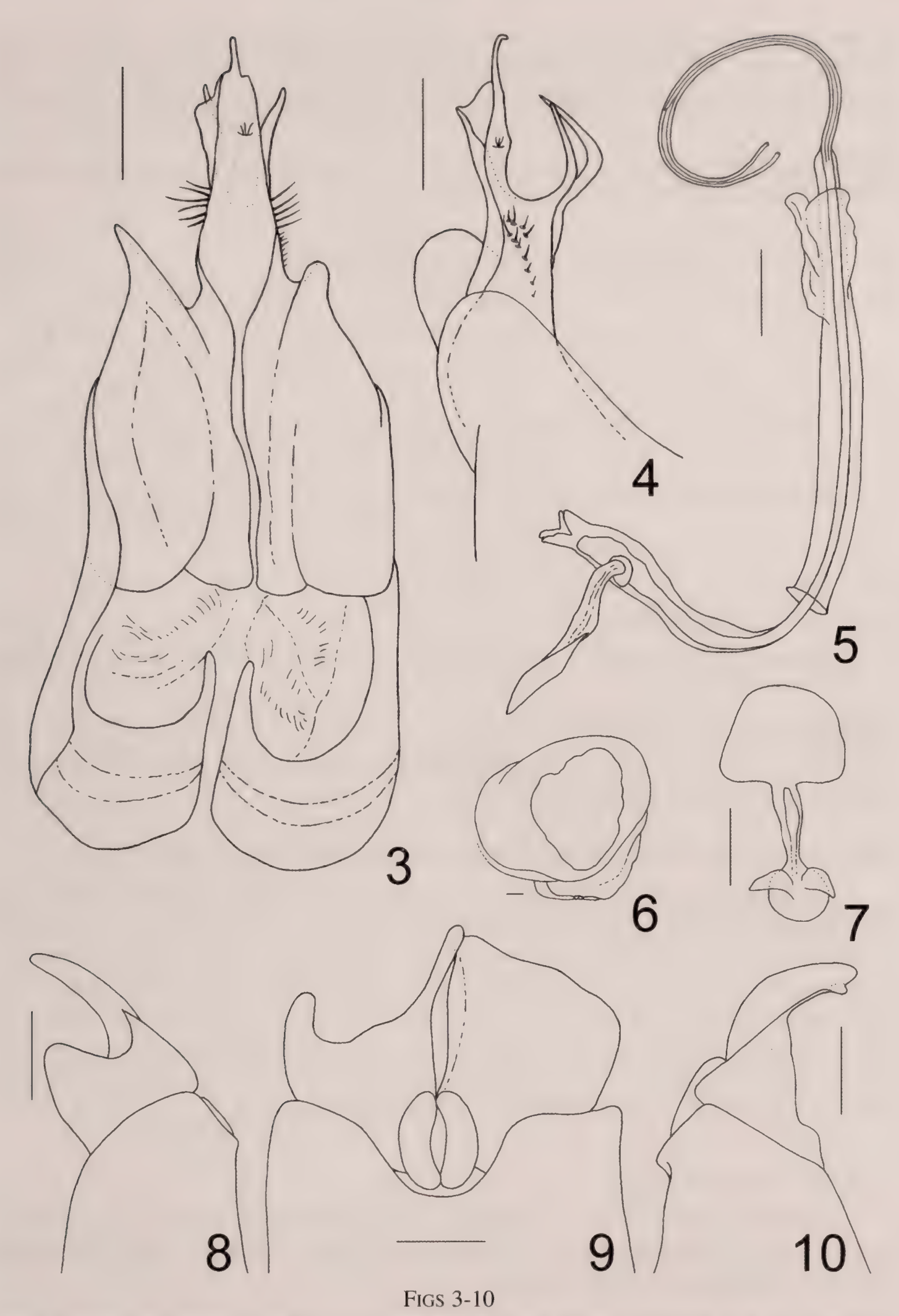
Legs (Fig. 1): Coxae dark, grey pollinose and with a yellow anteroapical margin on front and mid coxae. Mid coxa with one strong flattened dark anterior bristle and two shorter hairs on inner apical corner. Trochanters brownish-yellow, partly grey pollinose. Hind trochanter with about 4 short hairs anteroventrally. Femora dark, distinctly yellow at apices, grey pollinose except hind femur shining posteroventrally. Mid femur bearing two ventral rows of small peglike spines in apical two thirds. Front femur with posteroventral row of such spines in apical two thirds. Hind femur without such distinct ventral spines. Tibiae yellow and entirely grey pollinose, but ventrally in apical half brownish. Front and mid tibiae with small apical spines, as long as pulvilli. Hind tibia with a wrinkled indentation midanteriorly bearing no prominent spines or hairs. Tarsi yellowish and weakly grey pollinose, but distitarsus dorsally brown. Pulvilli as long as (fore leg) or slightly shorter (mid and hind leg) than distitarsi.

Abdomen (Fig. 1): Ground colour dark. Tergite 1 with five dark lateral bristles (up to 0.14 mm). Tergite 1 entirely grey pollinose. Tergite 2 to 5 laterally grey pollinose, extending onto dorsal surface along posterior margin and meeting (broadly so on tergite 2 and 5), otherwise brown pollinose. Syntergosternite 8 dark. Membranous area rather large and ovate, broadest in upper half, placed slightly to the right and caudally directed (Fig. 6). Sternites dark, grey pollinose.

Genitalia: Genital capsule dorsal view: Epandrium distinctly paler than tergites and longer than wide (MLE:MWE=1.2). Surstyli of the same colour as epandrium and asymmetrical (Fig. 9). Right surstylus deeply scythe-shaped with a long inner fingerlike projection, left surstylus of triangular shape. Genital capsule ventral view: Gonopods asymmetric, left one of medium size, right one small (Fig. 3). Phallus trifid, presumably all ejaculatory ducts of equal length (one ejaculatory duct is partly missing) and circular (Fig. 5). Phallic guide rather long, narrow and pointed, with lateral hairs in its middle (Fig. 3). Dorsal projections and hyaline ventral lobe somewhat visible but best seen from lateral view (see below). Subepandrial sclerite with few scattered inconspicuous hairs. Genital capsule lateral view: Left side of epandrium without a projecting ventral lobe but with a blunt angle (Fig. 10). Left surstylus distinctly convex dorsally (Fig. 10). Right surstylus as in Fig. 8. Phallic guide dorso - medially with two distinctive rather symmetric upcurved hooklike projections and a hyaline apical lobe on its left side (Fig. 4). Ejaculatory apodeme spade-shaped (Fig. 7).

FEMALE: unknown.

REMARKS: The species is placed within the *Eudorylas fascipes* species group as defined by Kehlmaier (2005a): Taxa with predominantly yellow postpronotal lobe and base of hind femur, the latter at least anteroventrally; males with a distinct dorsal projection in the shape of a lobe, nose, hook etc. on their phallic guide emerging from the middle part; left surstylus of triangular shape; female with distinctly bilobed ovipositor's base. In Europe, this group comprises nine rather common taxa. *Eudorylas manasi* sp. n. can be readily separated by the shape of its genitalia, most striking by the lateral shape of the phallic guide with its upcurved dorsomedial hooks but surstyli, gonopods and membranous area of syntergosternite 8 provide additional diagnostic features. For genital illustrations of the nine European taxa see Kehlmaier (2005a). Concerning the Eastern Palaearctic (Collin, 1941; Kozánek, 1988, 1992; Kozánek &



Figs 3-10

Male genitalia of holotype of *E. manasi* sp. n. (3) Phallic guide, gonopods and hypandrium in ventral view. (4) Phallic guide and gonopods in lateral view from right side. (5) Phallus, sperm pump and ejaculatory apodeme in ventral view (one ejaculatory duct partly missing). (6) Syntergosternite 8 in caudal view. (7) Ejaculatory apodeme. (8) Right surstylus in lateral view. (9) Surstyli in strictly dorsal view. (10) Left surstylus in lateral view. Scale bars = 0.1 mm.

Kwon, 1991; Kuznetzov, 1990a, 1990b, 1993, 1994; Morakote *et al*., 1990; Yang & Xu, 1989, 1996; Xu & Yang, 1990), only *Eudorylas duocollis* Morakote & Yano, 1990 from Japan, and known from the female sex only, might also be assigned to this group.

Addenda to the identification key of male Eudorylini provided in Kehlmaier (2005a: 57ff) starting from couplet 40

40 Ducts of phallus coiled to an almost complete circle (Fig. 5) 40a
40* Ducts of phallus shorter, at maximum semi-circular 41
40a Left gonopod larger than right one (Fig. 3). Phallic guide viewed laterally, with two upcurved dorsomedial hooks (Fig. 4). Membranous area of syntergosternite 8 large (Fig. 6) . . . *Eudorylas masani* Kehlmaier sp. n.
40a* Left gonopod smaller than right one (see Fig. 36a in Kehlmaier (2005a)). Phallic guide viewed laterally, with two small triangular dorsomedial projections (see Fig. 36b in Kehlmaier (2005a)). Membranous area of syntergosternite 8 small (see Fig. 36e in Kehlmaier (2005a)) . . . . *Eudorylas terminalis* (Thomson, 1870)

ADDITIONAL FAUNISTIC RECORDS

Chalarus brevicaudis Jervis, 1992

Material studied: 1♂ 1♀, Kyrgyz Republic, 11km N Tas Kumyr, 900m, 22.V.1994, leg. B. Merz, coll. MHNG.

Chalarus spurius (Fallén, 1816)

Material studied: 2♂, Kyrgyz Republic, Kara-Arthsa valley, 35km ESE Dzhambul, 1400m, 4.V.1994, leg. B. Merz, coll. MHNG.

PIPUNCULIDAE PRESENTLY KNOWN FROM THE KYRGYZ REPUBLIC

According to De Meyer (1996), De Meyer *et al*. (2000), Kehlmaier (2005) and this study, the following 13 Pipunculidae species have been recorded from the Kyrgyz Republic so far, representing approximately one tenth of the expected diversity: *Chalarus brevicaudis*, *C. spurius*, *Eudorylas auctus* Kehlmaier, 2005; *E. fusculus* (Zetterstedt 1844), *E. tshatkalensis* Kuznetzov, 1990; *Dorylomorpha albitarsis* (Zetterstedt, 1844); *D. extricata* (Collin, 1937); *D. incognita* (Verrall, 1901); *D. spinosa spinosa* Albrecht, 1979; *D. tanasijtshuki* Albrecht, 1990; *Tomosvaryella freidbergi* De Meyer, 1995 and *T. kirghizorum* Kuznetzov, 1993.

ACKNOWLEDGEMENTS

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Revue suisse de Zoologie 118 (1): 39-44; mars 2011

New *Platypalpus* Macquart from Hubei, China (Diptera, Empidoidea, Hybotidae, Tachydromiinae)

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[*] Correspondence author

New *Platypalpus* Macquart from Hubei, China (Diptera, Empidoidea, Hybotidae, Tachydromiinae). - Two new species of the genus *Platypalpus* Macquart belonging to the *P. longicornis* species-group are described as new to science: *P. dalongtanus* sp. n. and *P. pingqianus* sp. n. A key to the species of the genus from Hubei is presented.

Keywords: Diptera - Empidoidea - Tachydromiinae - *Platypalpus* - new species - China - Hubei.

INTRODUCTION

Platypalpus Macquart can be easily separated from all other genera of the family Hybotidae by the following combination of characters: eyes narrowly separated on face and frons, mid leg raptorial, and anal cell present (Chvála, 1975; Grootaert & Chvála, 1992). The genus is distributed worldwide with 547 known species, of which 46 species are recorded from China (Yang *et al.*, 2007). The major references dealing with Platypalpus in the Oriental and Palaearctic Regions are as following: Brunetti (1920), Frey (1943), Smith (1965), Chvála (1975, 1989), Grootaert & Chvála (1992), and Grootaert & Shamshev (2006).

So far, only two species are known from Hubei (Yang & Yang, 1997). Recently, two new species belonging to the *longicornis* species-group as defined by Chvála (1989) were collected. We are taking here the opportunity to describe and illustrate them. A key to the species from Hubei is presented which should help to facilitate their identification.

MATERIAL AND METHODS

The specimens were collected by Mr. Qifei Liu. The type material is deposited in the following collections:

CAU = Entomological Museum of the Agricultural University, Beijing, China
MHNG = Muséum d'histoire naturelle, Genève, Switzerland

In order to allow an easy comparison of descriptions of various authors, the ter - minology of morphological terms follows Grootaert & Chvála (1992). The following

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abbreviations for bristles are used: acr-acrostichial, av-anteroventral, h-humeral, oc-ocellar, npl-notopleural, psa-postalar, pv-posteroventral, sc-scutellar, vt-vertical.

KEY TO SPECIES OF *PLATYPALPUS* (DIPTERA, HYBOTIDAE) FROM HUBEI, CHINA

1a Thorax yellow; antenna yellow or dark yellow 2
1b Thorax black; antenna black . . . . *hubeiensis* Yang & Yang
2a Mesonotum and scutellum partly or entirely black 3
2b Mesonotum and scutellum entirely yellow . . . . *pingqianus* sp. n.
3a Mesonotum entirely yellow; scutellum black, mediotergite yellow; hind femur without ventral spines . . . . *guangxiensis* Yang & Yang
3b Mesonotum with a black mid-longitudinal stripe; scutellum and mediotergite black; hind femur with a row of tiny, black ventral spines on apical half . . . . *dalongtanus* sp. n.

SYSTEMATIC PART

Platypalpus dalongtanus sp. n. Figs 1-3

MATERIAL: Holotype ♂, CHINA, Hubei, Shennongjia, Dalongtan, 27. VI. 2009, leg. Qifei Liu (CAU). – Paratypes, 2 ♂, same data as holotype (CAU, MHNG).

ETYMOLOGY: The specific name refers to the type locality.

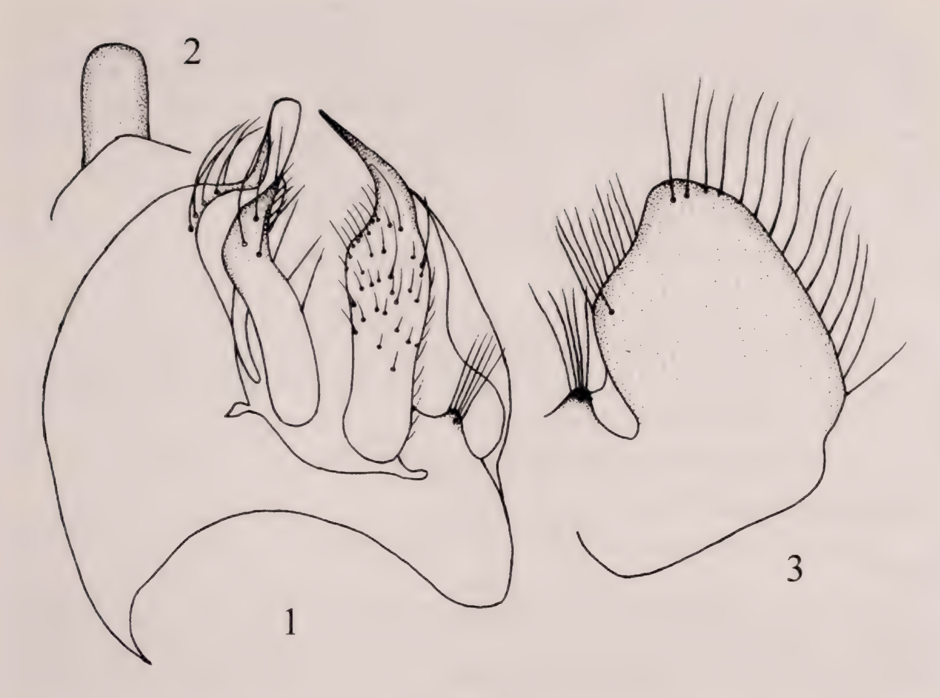
DIAGNOSIS: Thorax yellow except mesonotum with a black mid-longitudinal stripe, scutellum and mediotergite black. 2 pairs of vt. Antenna dark yellow; first flagellomere short oval (1.2-1.3 times longer than wide); mid femur without true posteroventral bristles; mid tibia with a finger-like, obtuse apical spur ventrally which is about as long as diameter of apex of tibia. Hind femur with a row of 8 black tiny ventral black spines on apical half.

DESCRIPTION

Male: Body length 3.2-3.5 mm, wing length 3.8-4.3 mm.

Head black, gray microtrichose. Distance between eyes on frons slightly wider than diameter of anterior ocellus; face narrower than frons. Hairs and bristles on head pale. Ocellar tubercle with 1 pair of *oc* and 4 very short posterior hairs; 2 pairs of *vt*. Antenna dark yellow; scape without dorsal bristles; pedicel with a circle of pale apical hairs; first flagellomere short oval, 1.2-1.3 times as long as wide, with some apical hairs; arista very long, 3.4-3.5 times as long as first flagellomere, blackish, short pubescent. Clypeus dark brown, shining. Proboscis almost as long as height of head, brownish yellow with brown hairs; palpus dark yellow with 3 long pale bristles ventrally.

Thorax yellow, thinly gray microtrichose; mesonotum subshining, with a black mid-longitudinal stripe (its short posterior part narrowed and not reaching scutellum); scutellum and mediotergite black. Hairs on thorax pale, bristles brownish yellow; 1 short hair-like h curved inwards, 2 npl (anterior *npl* short and hair-like), acr short, indistinctly 4-seriate, 1 long psa (nearly as long as posterior npl), 1 short presc (distinctly shorter than psa), scutellum with 2 pairs of sc (basal pair very short, one third as long as apical pair).



FIGS 1-3

Platypalpus dalongtanus sp. n, male. 1, genitalia, dorsal view; 2, right surstylus; 3, left epandrial lamella.

Legs yellow, but tarsomere 5 of all legs brown. Hairs on legs pale. Fore femur weakly and mid femur distinctly thickened, fore femur 1.1 times and mid femur 1.7-1.8 times as wide as hind femur; mid femur with two rows of short black ventral bristles (av very short, pv slightly longer than av, those on basal 1/4 distinctly longer and paler, more brownish yellow), without row of true pv; mid tibia with a row of blackish ventral bristles and a finger-like, obtuse apical spur which is about as long as apical diameter of the tibia. Hind femur with a row of 8 black tiny ventral spines on apical half.

Wing hyaline; veins brownish yellow, R_{4+5} and M parallel apically; basal cells equal, crossveins contiguous. Squama yellow with pale hairs. Halter yellow.

Abdomen yellow except tergites 1-6 brown or blackish, pale gray microtrichose; hypopygium black. Hairs on abdomen pale.

Male genitalia (Figs 1-3). Left epandrial lamella medially with a row of evenly long medially directed hairs in one row; right epandrial lamella wide in dorsal view, its apical projection (surstylus) nearly quadrate with obtuse apex; left cerci rather long, pointed and spine-like apically; right cercus short with nearly obtuse apex.

Female: Unknown.

DISTRIBUTION: China (Hubei).

REMARKS: The new species is similar to *Platypalpus hamatus* Yang & Yang from Tibet, but it can be separated from the latter by the mesonotum with a narrow mid-longitudinal stripe and the left epandrial lamella with a weak basal process with a brush of long bristles. In *P. hamatus*, the mesonotum has a rather wide mid-longitudinal stripe and the basal process of the left epandrial lamella is bare (Yang & Yang, 1989).

Platypalpus guangxiensis Yang & Yang, 1992

Platypalpus guangxiensis Yang & Yang, 1992: 46. TYPE LOCALITY: China: Guangxi, Tianlin.

DIAGNOSIS: Thorax yellow except scutellum black. 2 pairs of vt. Antenna yellow; first flagellomere short conical, 1.4 times longer than wide; arista 3.6 times as long as first flagellomere. Mid femur without true posteroventral bristles; mid tibia with a finger-like apical spur ventrally.

DISTRIBUTION: China (Hubei, Sichuan, Guangxi).

Platypalpus hubeiensis Yang & Yang, 1997

Platypalpus hubeiensis Yang & Yang, 1997: 1469. TYPE LOCALITY: China: Hubei, Xingshan.

DIAGNOSIS: Thorax entirely black. 2 pairs of vt. Antenna black; first flagellomere long conical, twice as long as wide; arista 3 times as long as first flagellomere. Mid femur without true posteroventral bristles; mid tibia with a finger-like apical spur ventrally.

DISTRIBUTION: China (Hubei).

Platypalpus pingqianus sp. n. Figs 4-6

MATERIAL: Holotype ♂; CHINA, Hubei, Shennongjia, Pingqian, 7. VII. 2009, leg. Qifei Liu (CAU). – Paratypes: 2 ♂ 1 ♀, same data as holotype (CAU, MHNG).

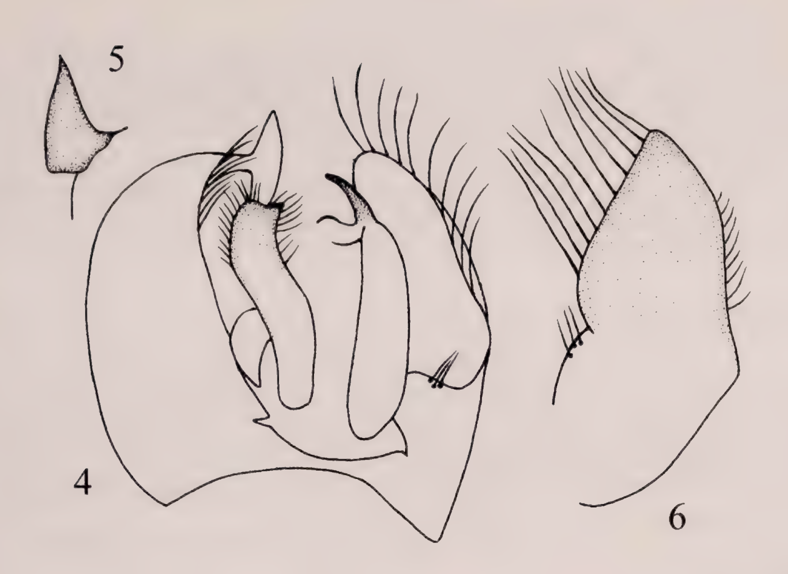
ETYMOLOGY: The specific name refers to the type locality.

DIAGNOSIS: Thorax nearly entirely yellow except katepisternum with a black dot at posterior margin. 2 pairs of vt. Antenna yellow; first flagellomere short oval (1.2-1.3 times longer than wide), arista over 4 times longer. Mid femur without true posteroventral bristles; mid tibia with a finger-like, obtuse apical spur ventrally which is about as long as apical diameter of tibia.

DESCRIPTION

Male: Body length 3.3-3.4 mm, wing length 3.1-3.2 mm.

Head black, gray microtrichose. Distance between eyes on frons slightly wider than diameter of anterior ocellus; face narrower than frons. Hairs and bristles on head pale. Ocellar tubercle with 1 pair of oc and 4 very short posterior hairs; 2 pairs of vt. Antenna yellow; scape without dorsal bristles; pedicel with a circle of pale apical hairs; first flagellomere short oval, 1.2-1.3 times longer than wide, with some apical hairs; arista much longer, 4.1-4.2 times as long as first flagellomere, blackish, short pubescent. Clypeus brownish, medially subshining. Proboscis almost as long as height of head, brownish yellow with brown hairs; palpus yellow with 2 long pale bristles dorsally in apical half.



FIGS 4-6

Platypalpus pingqianus sp. n, male. 4, genitalia, dorsal view; 5, right surstylus; 6, left epandrial lamella.

Thorax yellow, thinly gray microtrichose; mesonotum subshining; katepi - sternum with a black dot at posterior margin. Hairs on thorax pale, bristles brownish yellow; 1 short hair-like h curved inwards, 2 npl (anterior npl short and hair-like), acr short and indiscinct, irregularly 4-seriate, 1 long psa (nearly as long as posterior npl), 1 short presc (shorter than psa), scutellum with 2 pairs of sc (basal pair very short, one third as long as apical pair).

Legs yellow, but tarsomere 5 of all legs brown. Hairs on legs pale. Fore femur weakly and mid femur distinctly thickened, fore femur 1.1 times and mid femur 2.0-2.1 times as wide as hind femur; mid femur with two rows of short black ventral bristles (av very short, pv slightly longer than av, those on basal 1/4 longer and more brownish yellow), without row of true pv; mid tibia with a row of blackish ventral bristles and finger-like apical spur which is about as long as diameter of tibia at apex.

Wing hyaline; veins brownish yellow, R_{4+5} and M nearly parallel apically; basal cells subequal, crossveins therefore almost contiguous. Squama yellow with pale hairs. Halter yellow.

Abdomen yellow except tergites 1-6 brownish yellow, pale gray microtrichose; hypopygium brown. Hairs on abdomen pale.

Male genitalia (Figs 4-6). Apical projection (surstylus) of left epandrial lamella large and subtriangular with long bristles laterally and with a short row of short pale hairs; right epandrial lamella wide in dorsal view, its apical projection (surstylus) rather small and subtriangular with acute tip; left and right cercus of subequal length; left cercus with spine-like apex; right cercus short, its apex nearly obtuse.

Female: Body length 4.2 mm, wing length 3.3 mm. Similar to male.

Distribution: China (Hubei).

Remarks: The new species is very similar to *Platypalpus xanthodes* Yang & Merz from Guangxi, but it can be separated from the latter by the left cercus with the acute apical portion short, the right surstylus short and subtriangular with an acute tip, and the left epandrial lamella nearly acute apically. In *P. xanthodes*, the left cercus has a long, acute apical portion; the right surstylus is long and somewhat quadrate with a wide and nearly truncate tip; the left epandrial lamella is wide and obtuse apically (Yang & Merz, 2005).

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Our sincere thanks are due to Mr. Qifei Liu (China Agricultural University, Beijing) for collecting the specimens and to Dr. Bernhard Merz (Muséum d'histoire naturelle, Genève) for reviewing the paper. The research was funded by the National Natural Science Foundation of China (No. 30770259), the Doctoral Program of Higher Education of China (No. 20090008110016) and Chinese Universities Scientific Fund (No. 2009-2-08).

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REVUE SUISSE DE ZOOLOGIE 118 (1): 45-48; mars 2011

A new *Agyneta* Hull, 1911 from Iran (Araneae, Linyphiidae, Micronetinae)

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A new *Agyneta* Hull, 1911 from Iran (Araneae, Linyphiidae, Micronetinae). - A new species, *Agyneta iranica* sp. n., is described from Golestan, Iran, differing from congeners by the shape of the distal part of the lamella characteristica in the male, as well as by the much wider entrance ducts, which are well translucent through the proscape in the female. The correct data for the type locality of *Megalepthyphantes kandahar* Tanasevitch, 2009 is given.

Keywords: Arachnida - spiders - new species.

INTRODUCTION

One more species, *Agyneta iranica* sp. n., is added to the list of 67 linyphiid species known from Iran (Tanasevitch, 2009a). The new species was found in a forest in the Golestan Province near the border to Turkmenistan.

MATERIAL AND METHODS

This contribution is based on the spider material collected by Antoine Senglet from Iran, deposited in the Muséum d'histoire naturelle, Geneva (MHNG). Senglet's collection number is given in square brackets.

In the description, the sequence of leg segment measurements is as follows: femur + patella + tibia + metatarsus + tarsus. All measurements are given in mm. All scale lines in the figures correspond to 0.1 mm.

The terminology of palpal structures follows that of Saaristo & Tanasevitch (1996).

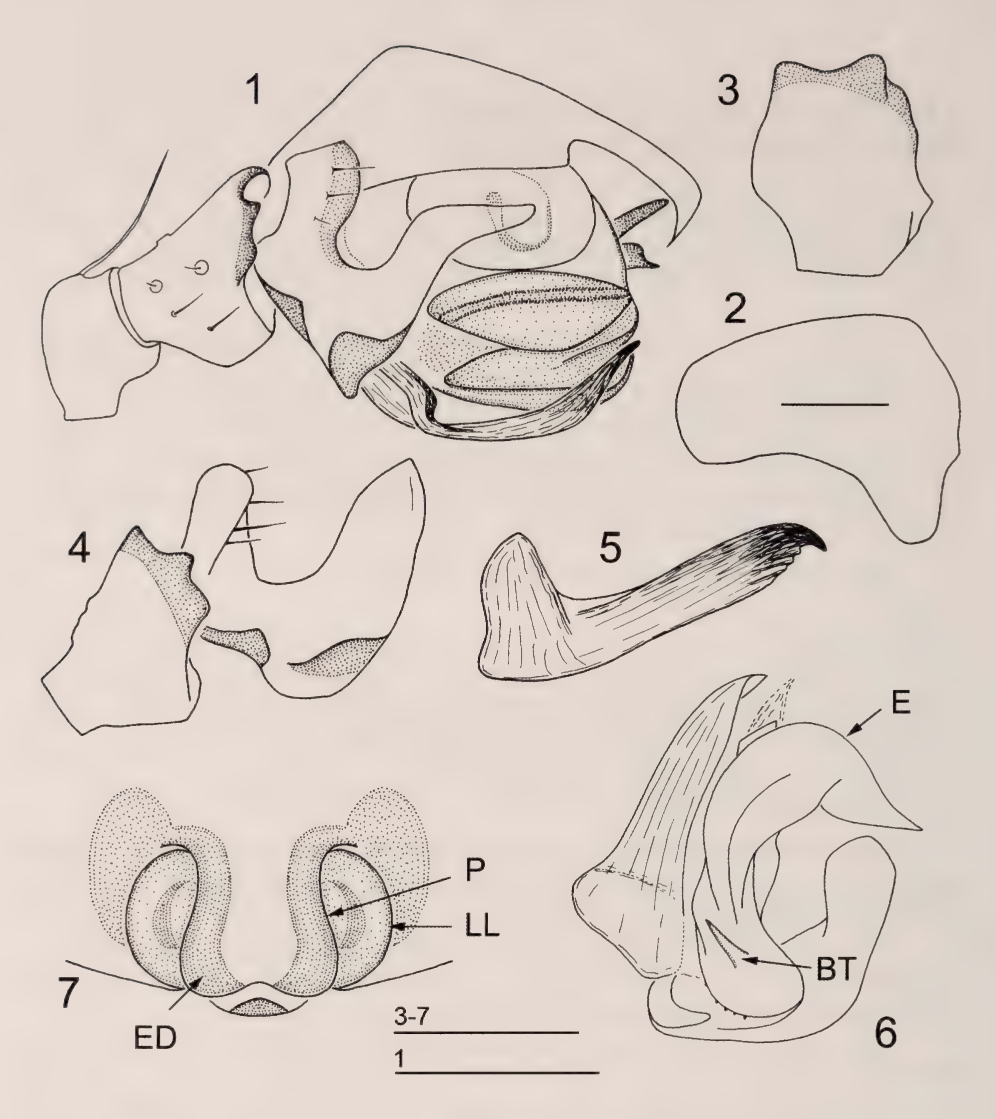
Abbreviations used in the text and figures: BT - basal tooth, E - embolus, ED - entrance duct, LL - lateral lobe, P - proscape, TmI - position of trichobothrium on tibia I.

Agyneta iranica sp. n. Figs 1-7

HOLOTYPE: MNHG (without registration number); ♂, Iran, Golestan; labeled as Mazandaran; Naharkhoran/Gorgan (36°44'N, 54°29'E), forest, sifted litter and moss; 20.VII.1973; leg. A. Senglet [7332].

PARATYPES: MNHG (without registration number); 2 ♀, same locality and date as for holotype.

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FIGS 1-7

Agyneta iranica sp. n., ♂ holotype (1-6) and ♀ paratype (7). (1) Right palp, retrolateral view. (2) Cymbium, prolateral view. (3) Palpal tibia, dorsal view. (4) Palpal tibia and paracymbium, lateral view. (5) Lamella characteristica, lateral view. (6) Embolic division. (7) Epigyne, ventral view.

ETYMOLOGY: The specific name, an adjective, is derived from the name of the country of origin.

DIAGNOSIS: The new species can be easily distinguished by the peculiar shape of the lamella characteristica, by the presence of a strong tooth at the base of the embolus in male, as well as by the much wider entrance ducts, which are well trans - lucent through the proscape in the female.

DESCRIPTION: Male. Total length 1.77. Carapace 0.75 long, 0.55 wide, brown, with a thin black margin. Chelicerae 0.32 long. Legs yellow to pale brown. Leg I 2.79 long (0.75+0.20+0.70+0.67+0.47), IV 2.86 long (0.77+0.20+0.72+0.65+0.52). Chaetotaxy: All tibiae with two dorsal spines only. Metatarsi spineless. TmI 0.26. Metatarsus IV without trichobothrium. Palp (Figs 1-6): Palpal tibia with two small outgrowths retrolaterally. Cymbium without posterodorsal outgrowth. Posterior and anterior pockets of paracymbium poorly expressed. Lamella characteristica like a narrow band with a hook apically. Embolus with a long tooth basally. Abdomen 1.00 long, 0.70 wide, pale grey.

Female. Total length 1.90. Carapace 0.75 long, 0.52 wide. Chelicerae 0.30 long, unmodified. Leg I 2.42 long (0.70+0.20+0.62+0.58+0.32), IV 2.46 long (0.72+0.20+0.62+0.60+0.32). TmI 0.22. Abdomen 1.20 long, 0.80 wide. Epigyne (Fig. 7): Proscape slightly narrowed basally. Entrance ducts very wide, well translucent through proscape. Lateral lobes of scape well-developed. Body and leg coloration, as well as chaetotaxy, as in male.

TAXONOMIC REMARKS: The new species seems to be most similar to the Turkmenian-Iranian *Agyneta kopetdaghensis* Tanasevitch, 1989, originally described from Kopet Dagh Mts, Turkmenistan (Tanasevitch, 1989), but differs clearly by the shape of the distal part of the lamella characteristica, which is claw-shaped in *A. iranica* sp. n., versus circular saw-like in *A. kopetdaghensis*. The female of the new species differs from that of *A. kopetdaghensis* by the much wider entrance ducts of the epigyne, well translucent through the proscape.

DISTRIBUTION: Known from the type locality only.

CORRIGENDA

In my previous paper on linyphiid spiders of Afghanistan (Tanasevitch, 2009b) the type locality of *Megalepthyphantes kandahar* Tanasevitch, 2009 has unfortunately been incorrectly given as AFGHANISTAN: Kandahar, E of Kandahar [7561] (31°37'N, 65°53'E), 1.VIII.1975, leg. A. Senglet. In fact the type locality of *M. kandahar* is as follows: AFGHANISTAN: Kabul Province, Golbagh [7567] (34°26'N, 69°07'E), 11.VIII.1975, leg. A. Senglet.

ACKNOWLEDGEMENTS

I am most grateful to Antoine Senglet (Vich, Switzerland), whose material served as the basis of the present paper, and to Peter J. Schwendinger (MHNG) for the opportunity to work on the spider collections of the Muséum d'histoire naturelle in Geneva. Sergei Golovatch (Moscow, Russia) kindly checked the English of an advanced draft. This study was supported in part by the Russian Foundation for Basic Research, projects # 09-04-01365-a and # 08-04-92230-a.

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On linyphiid spiders (Araneae) from the Eastern and Central Mediterranean kept at the Muséum d'histoire naturelle, Geneva

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On linyphiid spiders (Araneae) from the Eastern and Central Mediterranean kept at the Muséum d'histoire naturelle, Geneva. - Ten species are described as new: *Araeoncus cypriacus* sp. n., *A. rhodes* sp. n., *Archaraeoncus hebraeus* sp. n., *Improphantes cypriot* sp. n., *I. turok* sp. n., *Jacksonella bidens* sp. n., *Megalepthyphantes globularis* sp. n., *Stemonyphantes serratus* sp. n., *Troxochrus apertus* sp. n., and *Typhochrestus ikarianus* sp. n. Three new synonyms are established: *Erigone simillima* Keyserling, 1886 syn. n., *E. zographica* Crosby & Bishop, 1928 syn. n. and *E. viabilis* Chamberlin & Ivie, 1933 syn. n. = *E. cristatopalpus* Simon, 1884. A new combination is proposed: *Tapinocyba silvestris* Georgescu, 1973 = *Crosbyarachne silvestris* (Georgescu, 1973) comb. n. The previously unknown female of *Gongylidiellum orduense* Wunderlich, 1995 is described. Some misidentifications are corrected: some material from Austria labeled as *E. cristatopalpus* actually refers to *E. tenuimana* Simon, 1884; a male from Mongolia identified as *E. zographica/tirolensis* belongs to *E. whymperi* O. P.-Cambridge, 1877; a record of *Gonatium hilare* (Thorell, 1875) from Sakhalin, Russia actually refers to *G. nipponicum* Millidge, 1981, thus the known distribution of *G. hilare* is restricted to Europe. A distribution pattern is indicated for several species.

Keywords: Arachnida - Linyphiidae - new species - new synonyms - new combination - new records.

INTRODUCTION

Examining of the extensive undetermined spider collections from different regions of Europe and Asia in the Muséum d'histoire naturelle, Geneva (MHNG) revealed many new or little-known species. This paper is devoted to the linyphiids collected from some eastern, central European and Near Eastern countries, i.e., territories belonging to the Eastern and Central Mediterranean Region. The following list contains species which are new for science, are interesting and little-known, or are new to the fauna of that region.

MATERIAL AND METHODS

This paper is based on spider material kept at the MHNG and collected from Cyprus, Greece, Israel, Italy, Jordan, Lebanon, Malta, and Turkey. Some paratypes and

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non-type specimens are deposited in the collection of the Zoological Museum of the Moscow State University, Moscow, Russia. Collection numbers are given in square brackets.

The chaetotaxy of Erigoninae is given in a formula (e.g., 2.2.1.1) which refers to the number of dorsal spines on tibiae I-IV. In Micronetinae, the chaetotaxy is given in a different formula, e.g., Ti I: 2-1-1-2(1), which means that tibia I has two dorsal spines, one pro-, one retrolateral spine, and two or one ventral spine (the apical spines are disregarded). The sequence of leg segment measurements is as follows: femur + patella + tibia + metatarsus + tarsus. All measurements are given in mm. All scale lines in the figures correspond to 0.1 mm unless indicated otherwise.

The terminology of genitalic structures in Micronetinae follows that of Saaristo & Tanasevitch (1996), in Erigoninae it mainly follows that of Hormiga (2000).

Abbreviations

AMNH	American Museum of Natural History, New York, U.S.A.
ARP	Anterior radical process
ATA	Anterior tegular apophysis
BMNHC	Burke Museum of Natural History and Culture, Seattle, U.S.A.
Ca	Carina
CAT	Personal collection of Andrei Tanasevitch, Moscow, Russia
DA	Dorsal apophysis
DP	Dorsal plate
DPS	Distal part of scape
DSA	Distal suprategular apophysis
E	Embolus
EP	Embolus proper
L	Lamella characteristica
MHNG	Muséum d'histoire naturelle, Geneva, Switzerland
MM	Median membrane
MNHNP	Muséum national d'Histoire naturelle, Paris, France
MT	Mesal tooth
PCB	Personal collection of Don Buckle, Saskatoon, Canada
PMP	Posterior median plate
PT	Posterior tooth
R	Radix
RA	Radical apophysis
Re	Receptacle
RP	Radical part of embolic division
SMF	Senckenberg Museum, Frankfurt a. M., Germany
SS	Serrate surface
TA	Terminal apophysis
Th	Thumb
USNM	National Museum of Natural History, Smithsonian Institution, Washington, DC, U.S.A.
ZMMU	Zoological Museum of the Moscow State University, Moscow, Russia

RESULTS

Acartauchenius scurrilis (O. P.-Cambridge, 1872)

MATERIAL: 1 ♂, 1 ♀, Greece, Epirus, environs of Igoumenitsa, under stones, 25.III.1978, leg. S. Vit [1].

REMARKS: This species is here reported for the first time for the Greek fauna.

RANGE: European-Ancient Mediterranean.

Alioranus pastoralis (O. P.-Cambridge, 1872)

MATERIAL: 1 ♂, Cyprus, Troodos Mts, Cedar Valley, near camping, 1100 m a.s.l., under stones, 18.XI.1991, leg. B. Hauser [ZS-91/20]. – 1 ♂, E of Küçükerenköy, Olea plantation, 16.IV.1998, leg. S. Vit [98-24c]. – 1 ♀, Greece, Rhodes, Petaloudes, near pond, 15.IV.1977, leg. C. Besuchet [17a]. – 1 ♀, Turkey, Bornova, near Izmir, litter, 20.V.1974, leg. T. Jaccoud. – 1 ♂, Jordan, Wadi Schaib, 15.III.1968, leg. J. & S. Klapperich.

REMARKS: This species is here reported for the first time for the Turkish and Jordanian faunas.

RANGE: East Mediterranean.

Allotiso lancearius (Tanasevitch, 1987)

MATERIAL: 24 ♀; 5 ♀ (ZMMU), Turkey, SW of Artvin, 1900 m a.s.l., pasture in *Fagus & Picea* forest, under stones, 9.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [10a]. – 1 ♀, same locality, 1900 m a.s.l., sifting litter under *Fagus* & *Rhododendron*, 9.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [10d]. – 1 ♀, same locality, 1500 m a.s.l., *Fagus* & *Picea* forest with *Rhododendron*, sifting litter, 9.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [11b].

REMARKS: This species was hitherto known from the Caucasus only (Tanasevitch, 1987, 1990). It is here reported for the first time for the Turkish fauna.

RANGE: Caucasian.

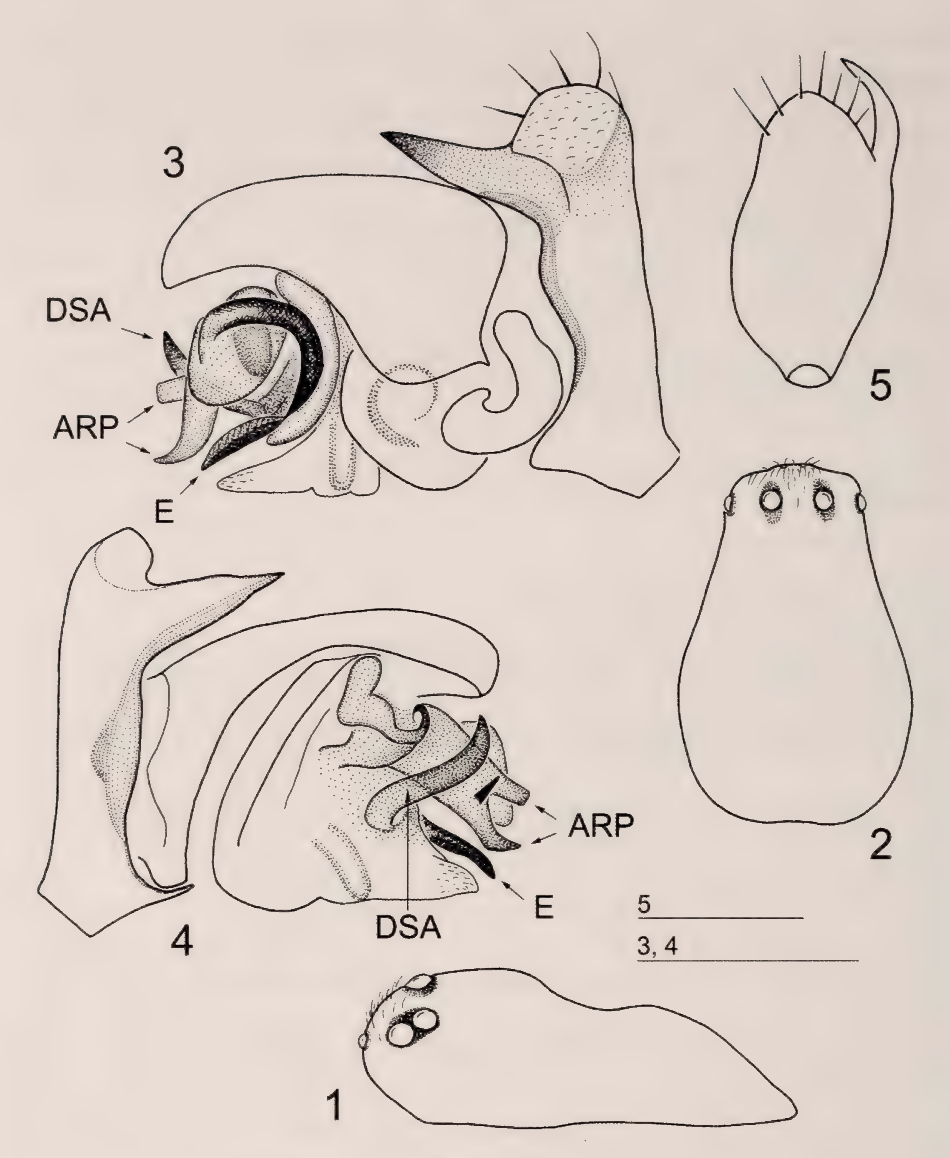
Araeoncus cypriacus sp. n. Figs 1-5

HOLOTYPE: ♂, Cyprus, Baths of Aphrodite, sifting leaf litter in ravine, 22.VIII.1977, leg. C. Besuchet [38].

ETYMOLOGY: The specific name, an adjective, is derived from the name of the island of origin.

DIAGNOSIS: The species is characterised by the shape of two anterior radical processes of the embolic division.

DESCRIPTION: Male. Total length 1.57. Carapace slightly modified as in Figs 1 & 2, 0.85 long, 0.55 wide, reddish brown. Chelicerae 0.25 long. Legs pale brown. Leg I 1.88 long (0.52+0.17+0.45+0.42+0.32), IV 1.97 long (0.55+0.17+0.50+0.45+0.30). Chaetotaxy: 2.2.1.1, spines very thin, their length about diameter of tibia. TmI 0.43. Metatarsus IV without trichobothrium. Palp (Figs 3-5): Cymbium with a long, pointed, slightly curved prolateral outgrowth. Paracymbium relatively small, hook-shaped. Distal suprategular apophysis like a long, narrow, slightly curved stripe. Embolic division complex in shape, with two anterior radical processes: one long, curved and pointed distally, other one short and blunt. A spear-shaped tooth present near base of



FIGS 1-5

Araeoncus cypriacus sp. n., ♂ holotype. (1, 2) Carapace, lateral and dorsal view, respectively. (3, 4) Left palp, retrolateral and prolateral view, respectively. (5) Palpal tibia, dorsal view.

anterior radical processes. Embolus circle-shaped. Abdomen 0.75 long, 0.55 wide, grey.

Female unknown.

TAXONOMIC REMARKS: The new species seems to be most similar to *A. rhodes* sp. n., see below.

DISTRIBUTION: Known from the type locality only.

Araeoncus rhodes sp. n. Figs 6-12, 20

HOLOTYPE: ♂, Greece, Rhodes, Petaloudes, sifting leaf litter, 8.IV.1977, leg. C. Besuchet [2b].

PARATYPE: 1 ♀, from same locality, collected together with the holotype.

TYPE MATERIAL EXAMINED FOR COMPARISON: MNHNP AR 12101. A vial labeled as "#6421 *Streptosphaenus culminicola* (*Diplocephalus c.*), Pic du Midi, E. Simon", contains 3 ♂ and 1 ♀ (a carapace and an abdomen, separated). Most probably, the female was placed into the syntype series later, as in fact Simon (1884) described *D. culminicola* only from males, and a female was described much later by Denis (1953). Denis's illustrations of the epigyne do not correspond to the epigyne of the female from Paris Museum, so the female in vial AR 12101 may not belong to *D. culminicola*.

ETYMOLOGY: The specific name, a noun, is derived from the name of the Greek Island where the new species was found.

DIAGNOSIS: The species is characterised by the shape of the anterior radical processes of the embolic division in the male, as well as by the peculiar shape of well visible translucent oblong receptacles in the female.

DESCRIPTION: Male. Total length 1.85. Carapace slightly modified as in Figs 6 & 7, 0.95 long, 0.62 wide, reddish brown. Chelicerae 0.27 long. Legs pale brown. Leg I 2.17 long (0.60+0.20+0.52+0.50+0.35), IV 2.29 long (0.65+0.20+0.60+0.52+0.32). Chaetotaxy: 2.2.1.1, spines length on TiI-III about 0.3-0.5 diameter of segment, on TiIV about diameter or a bit longer. TmI 0.43. Metatarsus IV without trichobothrium. Palp (Figs 8-12): Cymbium with a long, pointed, slightly curved prolateral outgrowth. Paracymbium relatively small, hook-shaped. Distal suprategular apophysis like a long, narrow, slightly curved band, pointed distally. Embolic division with two distal anterior radical processes almost equal in size to each other. Embolus relatively short and thick. Abdomen 0.87 long, 0.62 wide, grey.

Female. Total length 2.00. Carapace 0.80 long, 0.60 wide. Chelicerae 0.35 long. Leg I 2.09 long (0.60+0.17+0.50+0.47+0.35), IV 2.21 long (0.65+0.22+0.57+ 0.47+ 0.30). Length of spines on legs about of 1-1.5 diameter of segment. TmI 0.47. Abdomen 1.27 long, 1.00 wide. Epigyne typical for representatives of *Araeoncus* Simon, 1884, with well visible translucent oblong receptacles as in Fig. 20. Body and leg coloration, as well as chaetotaxy, as in male.

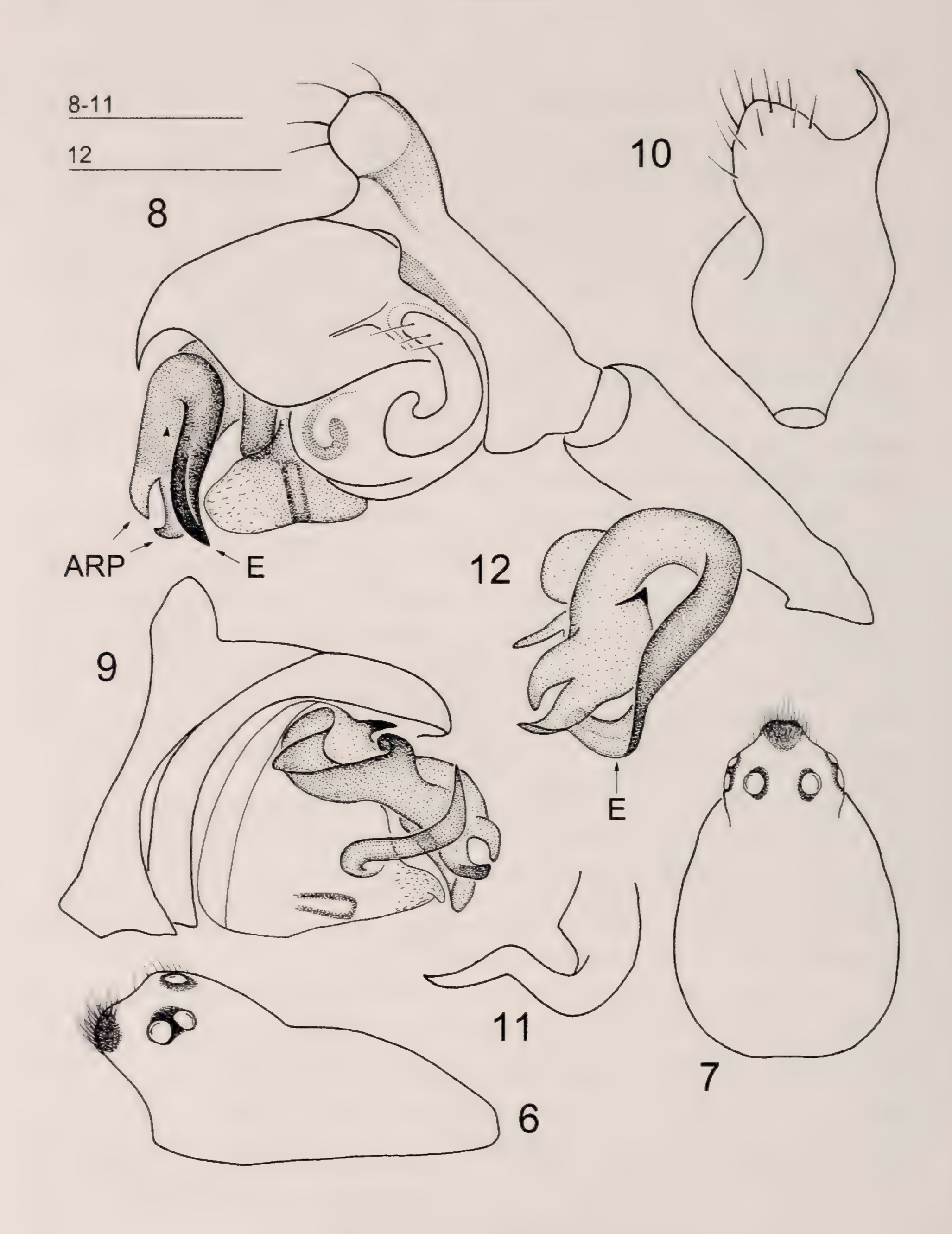
TAXONOMIC REMARKS: The new species seems to be most similar to *A. cypriacus* sp. n., but differs well by the shorter and thicker embolus, as well as by the shape of the anterior radical processes. The female can be easily distinguished by the peculiar shape of the well visible translucent oblong receptacles. The male carapace is very similar to that of *Diplocephalus culminicola* Simon, 1884, the palp of which has not yet been illustrated. The shape of the palpal tibia of *D. culminicola* is very similar to that of *Dactylopisthes mirificus* (Georgescu, 1976), and to the representatives of *Archaraeoncus* Tanasevitch, 1987, but the palpal conformation of *D. culminicola* is fully corresponding to that of *Diplocephalus* Bertkau, 1883.

DISTRIBUTION: Known from the type locality only.

Archaraeoncus hebraeus sp. n. Figs 13-19, 21

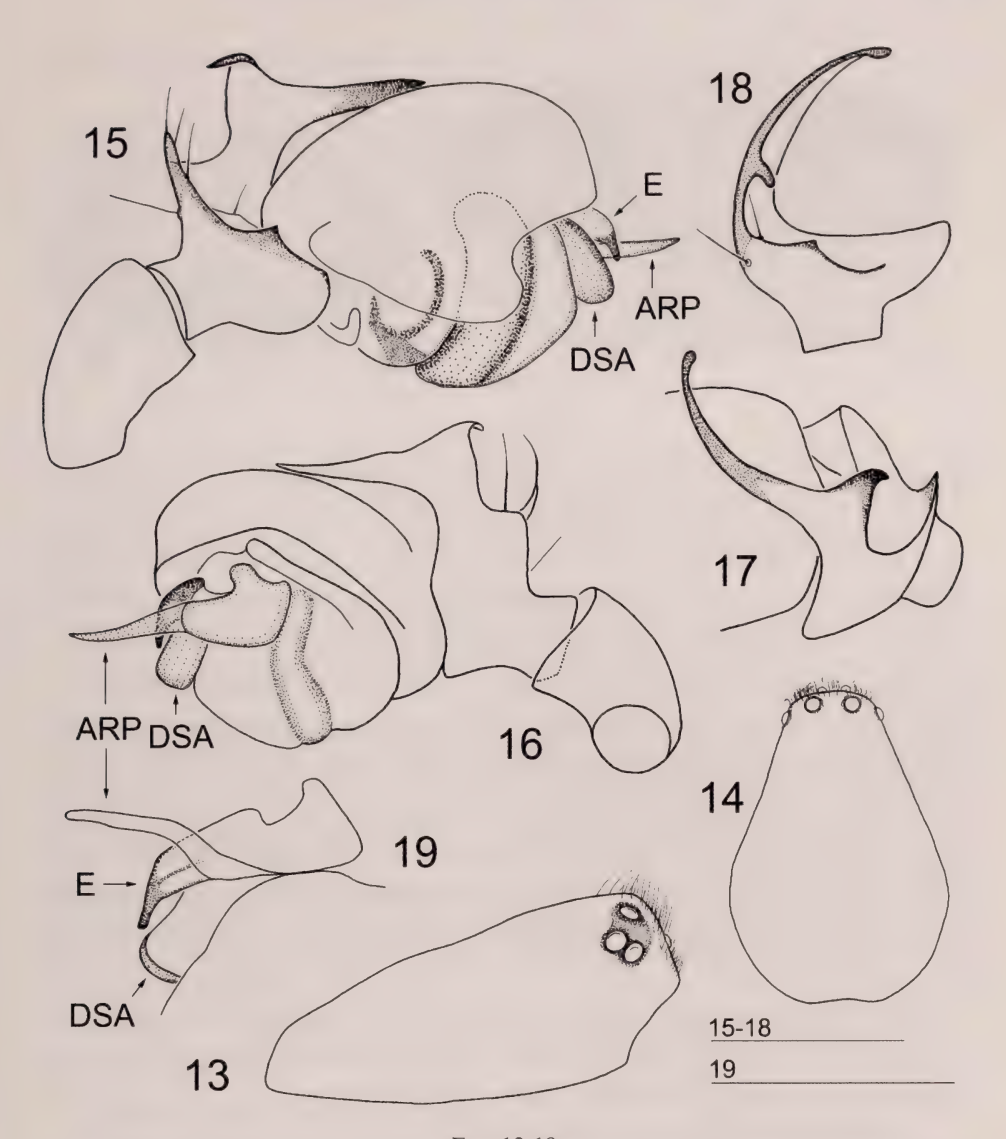
HOLOTYPE: ♂, Israel, Maize, Newe Yaar, summer 1986, leg. S. Heimer.

PARATYPE: 1 ♀, Israel, Galilee, Ginosar, on bank of stream, 20.-21.V.1973, leg. I. Löbl [Is-73/1].



FIGS 6-12

Araeoncus rhodes sp. n., ♂ holotype. (6, 7) Carapace, lateral and dorsal view, respectively. (8, 9) Left palp, retrolateral and prolateral view, respectively. (10) Palpal tibia, dorsal view. (11) Distal suprategular apophysis, anterior view. (12) Embolic division, anterior view.



FIGS 13-19

Archaraeoncus hebraeus sp. n., ♂ holotype. (13, 14) Carapace, lateral and dorsal view, respectively. (15, 16) Right palp, retrolateral and prolateral view, respectively. (17, 18) Palpal tibia, prolateral and dorsal view, respectively. (19) Embolic division and distal suprategular apophysis, prolateral view.

ETYMOLOGY: The specific name, an adjective, translated from Latin as "Jewish".

DIAGNOSIS: The new species is characterised by the peculiar shape of the palpal tibia, and by the presence of only one distal suprategular apophysis.

DESCRIPTION: Male. Total length 1.43. Carapace slightly modified as in Figs 13 & 14, 0.67 long, 0.45 wide, brown. Chelicerae 0.22 long. Legs pale brown. Leg I 1.47



FIGS 20, 21

Epigyne of *Araeoncus rhodes* sp. n., ♀ paratype from Petaloudes, Greece (20), and of *Archaraeoncus hebraeus* sp. n., ♀ paratype from Ginosar, Israel (21).

long (0.42+0.15+0.35+0.30+0.25), IV 1.57 long (0.45+0.15+0.40+0.32+0.25). Chaetotaxy: 2.2.1.1, but can be misunderstood as 1.1.1.1, because spines, especially distal ones, scarcely visible. Length of spines on Ti I-III about 0.25-0.30 diameter of segment, on TiIV about 0.5 diameter. TmI 0.42. Metatarsus IV without trichobothrium. Palp (Figs 15-19): Palpal tibia sickle-shaped, with a curved pointed outgrowth on dorsal side. Distal suprategular apophysis relatively short, rounded distally. Embolic division with a long, narrow, spear-shaped anterior radical process, embolus short. Abdomen 0.77 long, 0.55 wide, grey.

Female. Total length 1.34. Carapace 0.65 long, 0.47 wide. Chelicerae 0.20 long. Leg I 1.49 long (0.42+0.17+0.35+0.30+0.25), IV 1.60 long (0.47+0.17+0.40+0.31+0.25). Chaetotaxy: 2.2.1.1, proximal spines about as long as diameter of segment, distal spines half of it. TmI 0.45. Abdomen 0.70 long, 0.50 wide. Epigyne with a small aperture, receptacles spherical, wide apart as shown in Fig. 21. Body and leg coloration as in male.

TAXONOMIC REMARKS: The new species is very similar to *A. prospiciens* (Thorell, 1875), but differs clearly by the presence of only one distal suprategular apophysis, as well as by the peculiar shape of the palpal tibia.

DISTRIBUTION: Known from Israel only.

Araeoncus humilis (Blackwall, 1841)

MATERIAL: 1 ♂, Turkey, Çamlihemş in, Rize Village, sifting litter, 27.VII.1973, leg. S. Vit [8].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: European-Ancient Mediterranean.

Asthenargus paganus (Simon, 1884)

MATERIAL: 1 ♂, 6 ♀, Italy, Aosta Valley, Velde, Gressoney, Fontainemore, 1500 m a.s.l., litter under *Alnus viridis*, X.1980, leg. A. Focarile [10].

RANGE: European.

Canariphantes homonymus (Denis, 1934) Figs 22-26

MATERIAL: 1 ♂, Greece, Euboea, Prokopion, 6.VIII.1979, leg. B. Hauser.

REMARKS: This species was hitherto known from the West Mediterranean: Portugal, France Morocco and Algeria (Bosmans & Bouragba, 1992); it is here reported for the first time for the Greek fauna.

RANGE: Mediterranean.

Caviphantes pseudosaxetorum Wunderlich, 1979

MATERIAL: 1 ♀, Lebanon, Jeila, Nahr El Kalb, sifting dry leaf litter under *Platanus* & *Quercus*, 26.III.1975, leg. C. Besuchet [3].

COMPARATIVE MATERIAL EXAMINED: SMF 29677, *Caviphantes pseudosaxetorum*, 1 ♀ paratype.

REMARKS: This species was described from Nepal, 2100-2900 m a.s.l. (Wunderlich, 1979), but has a wide geographical range: besides Nepal and Lebanon, it also has been found in northern Pakistan and southern India (Tanasevitch, in preparation). This species is here reported for the first time for the Lebanese fauna.

Centromerus arcanus (O. P.-Cambridge, 1873)

MATERIAL: 1 ♀, Italy, Sestriere, 28.VIII.1967, leg. A. Comellini.

RANGE: West Palaearctic.

Centromerus brevivulvatus Dahl, 1912

MATERIAL: 4 ♂, 3 ♀, Italy, Aosta Valley, Velde, Gressoney, Fontainemore, 1500 m a.s.l., litter under *Alnus viridis*, X.1980, leg. A. Focarile [10].

RANGE: West Palaearctic.

Centromerus pabulator (O. P.-Cambridge, 1875)

MATERIAL: 1 ♀, Italy, Toggia Valley, 24.X.1967, leg. A. Comellini.

Centromerus semiater (L. Koch, 1879)

MATERIAL: 1 ♀, Italy, Mt Faloria, Cortina d'Ampezzo, 24.VI.1967, leg. A. Comellini.

RANGE: West Palaearctic.

Centromerus serratus (O. P.-Cambridge, 1875)

MATERIAL: 1 ♂, 4 ♀, Italy, Aosta Valley, Porossan, near Aosta, 700 m a.s.l., litter under *Quercus pubescens*, 13.III.1980, leg. A. Focarile [9].

RANGE: Mediterranean.

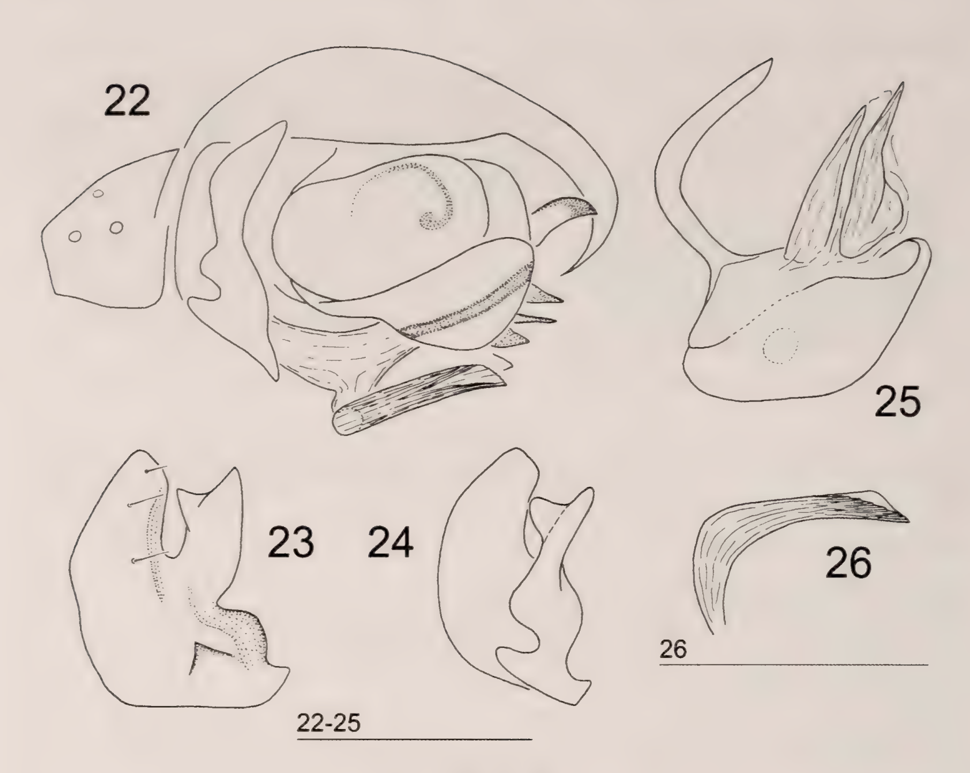
Ceratinella brevipes (Westring, 1851)

MATERIAL: 1 ♂, 1 ♀ Italy, Mt Mucrone, 27.V.1967, leg. A. Comellini.

RANGE: Palaearctic.

Ceratinella brevis (Wider, 1834)

MATERIAL: 1 ♀, Turkey, Kastamonu, Ilgazdag, route Kastamonu - Çankiri, Diphan, 1300 m a.s.l., 17.V.1976, leg. C. Besuchet & I. Löbl [20]. – 1 ♀, environs of Bolu, Omerler, 800 m a.s.l., *Fagus* & *Picea* forest, sifting litter, 21.V.1976, leg. C. Besuchet & I. Löbl [32d]. – 1 ♀,



FIGS 22-26

Canariphantes homonymus (Denis, 1934), ♂ from Prokopion, Greece. (22) Right palp, retro - lateral view. (23, 24) Paracymbium, different aspects. (25) Embolic division. (26) Lamella characteristica.

9 km N of Mengen, route Mengen - Devrek, 750 m a.s.l., *Fagus* & *Picea* forest with *Rhododendron*, sifting litter, 23.V.1979, leg. C. Besuchet & I. Löbl [34].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: Palaearctic.

Cinetata gradata (Simon, 1881)

MATERIAL: 3 ♂, 5 ♀; 1 ♂, 5 ♀ (ZMMU), Italy, S-Tirol, Schnalstal, Mt Katarine, road to Vernatsch, 1350 m a.s.l., timberline, shaking *Juniperus sabina*, 24.X.1989, leg. S. Hauser [BZ-89/3]. – 5 ♀, same locality, shaking *Larix*, 24.X.1989, leg. S. Hauser [BZ-89/5]. – 1 ♂, 6 ♀, same locality, leg. S. Hauser [BZ-89/5].

RANGE: Mediterranean.

Cresmatoneta mutinensis (Canestrini, 1868)

MATERIAL: 1 ♂, Cyprus, Polis, bank of river, sifting litter under *Tamarix* & *Scirpus*, 21.IV.1981, leg. C. Besuchet [32].

REMARKS: This species is here reported for the first time for the Cyprian fauna.

RANGE: Mediterranean.

Crosbyarachne silvestris (Georgescu, 1973) comb. n.

MATERIAL: 7 ♂, 14 ♀; 2 ♂, 2 ♀ (ZMMU), Italy, Tuscany, Mt Argentario, Maremma, 280-400 m a.s.l., sifting litter under *Quercus ilex* & *Q. suber*, 13.-14.II.1980, leg. A. Focarile.

COMPARATIVE MATERIAL EXAMINED: 5 ♂, 1 ♀, Romania, Seica Nare, pitfall, IV.1980, from collection of I. Weiss.

REMARKS: According to the palp and epigyne conformation *Tapinocyba silvestris* Georgescu, 1973 clearly belongs to the genus *Crosbyarachne* Charitonov, 1937 and is similar to its single representative, *C. bukovskyi* Charitonov, 1937, known from the Crimea and Turkey (Gnelitsa, 2009). A comparison between the Italian and Romanian specimens of *C. silvestris* comb. n. has shown their identity, whereas similar specimens from Greece show small but stable differences (see below). This species is here reported for the first time for the Italian fauna.

RANGE: Mediterranean.

Crosbyarachne aff. ***silvestris*** (Georgescu, 1973)

MATERIAL: 1 ♀, Greece, Thessalie, SW of Mouresi, 750 m a.s.l., road in forest, rocks, in moss, 11.IV.2004, leg. S. Vit [12]. – 1 ♀, same locality, 11.IV.2004, leg. S. Vit [12]. – 1 ♂, W of Makrirachi, 500 m a.s.l., fruit garden, litter under *Castanea*, 9.IV.2004, leg. S. Vit [4]. – 1 ♂, 4 ♀, N of Neochorio, 450 m a.s.l., in rotten *Pinus* stub, 2.IV.2004, leg. S. Vit [14]. – 1 ♀, Epirus, E of Neraida, between Igoumenitsa and Loannina, in rotten *Laurus* stub, 25.III.1978, leg. S. Vit [3]. – 1 ♂, Euboea, Mt Dirfis, route Nea Artaki - Stropones, above Stropones, 650 m a.s.l., litter under *Abies cephalonica*, 30.IV.1987, leg. B. Hauser [Ir-87/26]. – 1 ♀, route Nea Artaki - Mantoudion, 600 m a.s.l., litter under *Pinus* & *Quercus*, 1.V.1987, leg. B. Hauser [Ir-87/33].

REMARKS: The male palp of *C.* aff. *silvestris* from Greece is very similar to that of specimens from the Italian and Romanian populations of *C. silvestris*, but have a slightly longer embolus; females also somewhat differ by vulva arrangement. Noteworthy, a male from Euboea has the embolus of intermediate size, which is a bit shorter than in males from Thessalie or Epirus, but still longer than in the Italian and Romanian populations. Thus, the systematic position of *C.* aff. *silvestris* from Greece is problematic.

Dactylopisthes digiticeps (Simon, 1881)

MATERIAL: 1 ♂, Turkey, Istanbul, between Yalova and Orhangazi, *Quercus* forest, sifting litter, 11.V.1976, leg. C. Besuchet & I. Löbl [1]. – 1 ♀, Israel, Galilee, Ginosar, on bank of stream, 20.-21.V.1973, leg. I. Löbl [Is-73/1].

REMARKS: This species is here reported for the first time for the Turkish and Israeli faunas.

RANGE: Eastern-Ancient Mediterranean.

Diplocentria bidentata (Emerton, 1882)

MATERIAL: 1 ♀, Italy, Cervinia, 23.V.1967, leg. A. Comellini.

REMARKS: This species is here reported for the first time for the Italian fauna.

RANGE: Holarctic.

Diplocephalus caucasicus Tanasevitch, 1987

MATERIAL: 1 ♂, Turkey, between Hopa and Kemalpasa, 11 km from Hopa, sifting litter under ferns and blackberry, 10.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [12a].

REMARKS: This species was hitherto known from the Caucasus only (Tanasevitch, 1987, 1990). *D. caucasicus* is here reported for the first time for the Turkish fauna.

RANGE: Anatolian-Caucasian.

Diplocephalus picinus (Blackwall, 1841)

MATERIAL: 1 ♂, Turkey, 10 km from Zonguldak, route Zonguldak - Çaycuma, 500 m a.s.l., *Fagus* forest with *Rhododendron*, sifting litter, 23.V.1976, leg. C. Besuchet & I. Löbl [35]. – 1 ♂, Sinop, above Bektas, 23 km N of Boyabat, route Boyabat - Sinop, 1100 m a.s.l., *Fagus* forest, sifting litter, 20.V.1976, leg. C. Besuchet & I. Löbl [31].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: West Palaearctic.

Diplocephalus protuberans (O. P.-Cambridge, 1875)

MATERIAL: 4 ♂, 5 ♀, Italy, Sestriere, 28.VIII.1967, leg. A. Comellini.

RANGE: Mediterranean.

Entelecara acuminata (Wider, 1834)

MATERIAL: 1 ♂, Turkey, Kars, 16 km SW of Göle, 1600 m a.s.l., *Quercus* forest, sifting litter and moss, 16.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [24d].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: West Palaearctic.

Erigone cristatopalpus Simon, 1884 Figs 27-42, 48-52

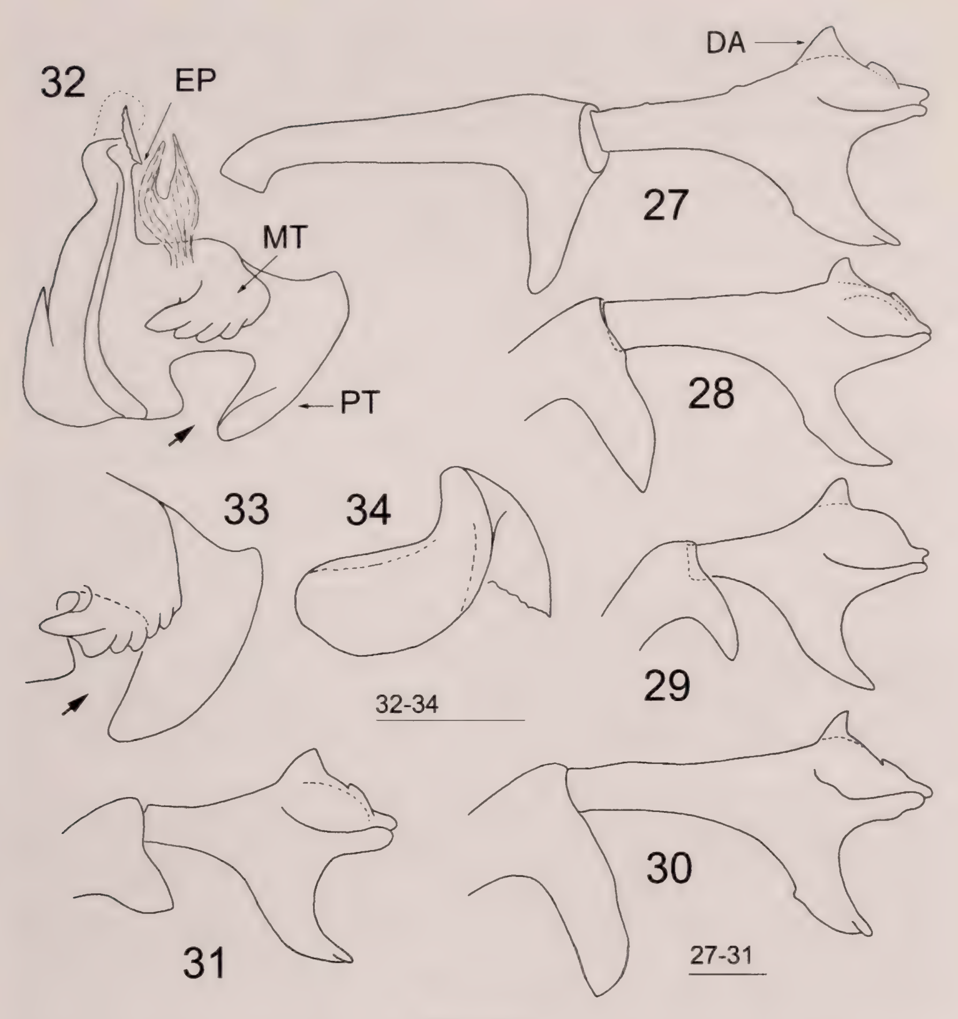
Erigone simillima Keyserling, 1886 **syn. n.**
E. zographica Crosby & Bishop, 1928 **syn. n.**
E. viabilis Chamberlin & Ivie, 1933 **syn. n.**

MATERIAL: 1 ♂, 1 ♀, Italy, Falzarego, Cortina d'Ampezzo, 25.VI.1967, leg. A. Comellini. – 19 ♂, 16 ♀; 4 ♂, 4 ♀ (ZMMU), Toggia Valley, 24.X.1967, leg. A. Comellini. – 1 ♂, 2 ♀, Bergamo, Foppolo, 2000 m a.s.l., 24.VI.1977, leg. A. Comellini.

TYPE MATERIAL EXAMINED: *E. cristatopalpus* Simon, 1884, MNHNP AR 12737. A vial labeled as "#4927 *E. cristatopalpus* E. Simon, Alps", contains syntypes: eight conspecific males and four females of *E. cristatopalpus*, as well as a male of *E. tenuimana* Simon, 1884. Simon (1884) did not designate a holotype and provided the description with two figures of the male palpal tibia. A male of *E. cristatopalpus*, the palpal tibia of which corresponds best to the original figures, I here designate as the lectotype; the other seven males and four females are paralectotypes. The male of *E. tenuimana* is excluded from the type series.

E. tenuimana Simon 1884, MNHNP 4926. The type series of *E. tenuimana* (tube ES #5226) is either lost or mixed with the type series of *E. leptocarpus* (tube ES #4926) (Christophe Hervé, pers. com.). A vial labeled as "#4926, *E. tenuimanus* E. S. (= *leptocarpus*), Alps", contains eight conspecific males of *E. tenuimana* and a female of *E. cristatopalpus*, which has already been separated by A. Hänggi (Muster & Hänggi, 2009: 990). I designate one of these males as the lectotype, the other seven males are paralectotypes.

E. simillima Keyserling, 1886, USNM 1653. A vial labeled as "TYPE", A-139, *Erigone simillima* Keyserling (additional labels inside the vial: Coll. Marx #226; USNM #20533/4; #226/3) contains four males. One male is *E. atra* Blackwall, 1833; the three others are conspecific despite their different size. The biggest male is 3.68 mm long, and it corresponds to the specimen mentioned in the original description (3.6 mm); this male I here designate as the



FIGS 27-34

Erigone cristatopalpus Simon, 1884, palp details. (27-31) Right patella and palpal tibia, retrolateral view. (32) Embolic division. (33) Mesal and posterior tooth of embolic division. (34) Distal suprategular apophysis. (27, 32-34) Specimen from Foppolo, Italy. (29, 30) Specimens from Toggia, Italy. (28, 31) Specimens from Lake Tignes, France.

lectotype. Two other males, paralectotypes, are rather smaller and approximately 2.8-2.9 mm long. The male of *E. atra* is excluded from the type series. Note: the embolus proper in the embolic division of the right palp of the lectotype is broken off.

E. viabilis Chamberlin & Ivie, 1933, AMNH without registration number. A vial labeled as "♂ holotype, ♀ allotype" contains a male and a female, with one palp and the epigyne separated. Note: the dorsal apophysis (sensu Muster & Hänggi, 2009) on the right palpal tibia is broken off or underdeveloped/reduced.

E. zographica Crosby & Bishop, 1928, AMNH without registration number. A vial labeled as "TYPE", contains a male with two palps separated, right one lacks of the embolic division.

COMPARATIVE MATERIAL EXAMINED: *E. cristatopalpus*, 2 ♂, 5 ♀, France, Savoie, Lake Tignes, 2100 m a.s.l., 9.VIII.1965, leg. A. Comellini. – 1 ♂, 1 ♀, same locality and date, leg. A. Comellini. – 2 ♂, 1 ♀, Haute-Savoie, Tête de Jaillet (= Col du Jaillet), southern part of Aravis Mts, summit of Le Petit Croissebaulet with herbs, 2009 m a.s.l., 6.X.1951, leg. A. Comellini [4]. – 3 ♀, Austria, Northern Tyrol, St Anton am Arlberg, Mt Galzig, 2150 m, 7.VIII.1967, leg. A. Comellini.

E. viabilis, 4 ♂, 4 ♀ (BMNHC), Russia, Magadan Area, environs of Talon, Taui River (59.7619°N, 148.6561°E), ca 20 m a.s.l., summer 1988, leg. A. Ryabukhin.

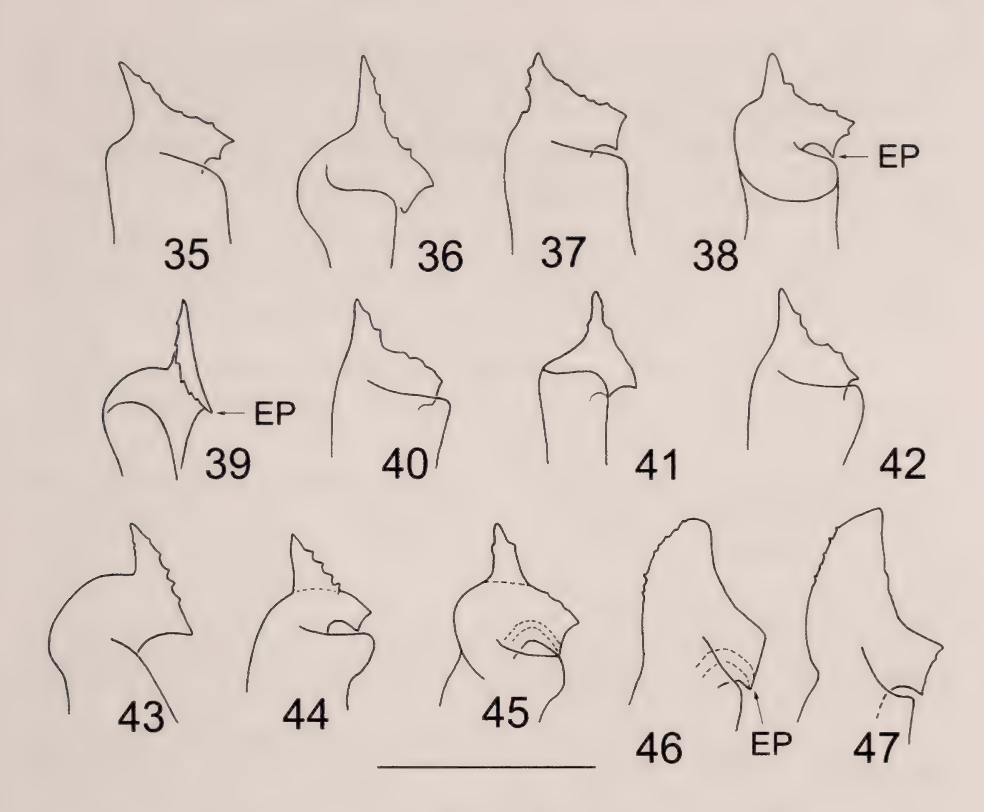
E. zographica, BMS: 1 ♂, 3 ♀, U.S.A., State of Washington, Elwha River Mouth, Warrior Trail end (48.1475°N, 123.5591°W), swept along estuary shoreline, 19.VI.2008, leg. R. Crawford. – 1 ♂, 2 ♀, Deemer Creek (48.931°N, 117.089°W), 1400 m a.s.l., ex soggy moss beds at stream edge, 11.-13.VI.1986, leg. R. Crawford. – 14 ♂, 7 ♀, Samish River (48.554°N, 122.452°W), swept in tidal sedge/grass, 23.VI.1990, leg. R. Crawford. – 1 ♂, 8 ♀, Waterside Trail (47.646°N, 122.295°W), ex moss in Salix and Typha thickets, 14.II.1982, leg. R. Nelson. – Several ♂ & ♀, Russia, Kurile Islands, Paramushir Island, SW shore, Taina River (50.3667°N, 155.6000°E), leg. Y. Marusik. – PCB: 1 ♂, Canada, Alberta, Caribou Mountains Wildland, Wentzel Lake (utm N0645415, E6550961), horsetail meadow, sweeping, 16.VII.2003, leg. T. Johnson. – 1 ♂, 2 ♀, Willmore Wilderness Park, Casket Creek (N5965296, E307675), willow meadow, in grass, 12.-20.VII.2007, leg. G. Hilchie, D. Macaulay. – 1 ♀, Swift Creek (N5979060, E328687), 2012 m a.s.l, 13.-20.VII.2007, leg. G. Hilchie, D. Macaulay. – 1 ♂, 2 ♀, unnamed valley (N5958369, E32991), talus, meadow, creek, 1649 m a.s.l., 12.-20.VII.2007, leg. G. Hilchie, D. Macaulay. – 2 ♂, 1 ♀, Fetherstonhaugh Creek (N5957323, E312011), talus, meadow, creek, 1949 m a.s.l., 22.-28.VI.2007, leg. T. Johnson, G. Hilchie. – 1 ♀, Kakwa Wildland Province Park, Deadhorse Meadows (54.138950°N, 119.926717°W), 15.-20.VI.2006, leg. T. Johnson. – 1 ♀, same locality, 28.VI.-15.VII.2006, leg. T. Johnson. – 1 ♂, same locality, 26.VI.-17.VII.2006, leg. T. Johnson. – 1 ♂, Berg Lake (53.9480°N, 119.9152°W), 1986 m a.s.l., 25.VII.2006, leg. T. Johnson. – 1 ♀, Sulphur Ridge (N6004152, E318269), 17.-22.VI.2006, leg. T. Johnson, D. Vujnovic. – 1 ♂, same locality, 17.-22.VI.2006, leg. T. Johnson, D. Vujnovic. – 1 ♂, Saskatchewan, Cypress Hills, Central Block, forest pond, ex *Rana pipiens*, 4.VI.1969, leg. D. Reid.

E. simillima, ZMMU: 1 ♂, 4 ♀, Russia, Magadan Area, upper reaches of Kolyma River, near Sibit-Tyellakh, J. London Lake, 25.VIII.1984, leg. K. Eskov, Y. Marusik. – 20 ♂ & ♀, near Sibit-Tyellakh, alpine belt, 1100 m a.s.l., 15.VIII.1985, leg. Y. Marusik. – 1 ♂, Commander Islands, Mednyi Island, VII.-VIII.1978, leg. S. Popov. – 1 ♂, 13 ♀, Mednyi Island, Glinka Gulf, grass tundra, 31.VI.-1.VIII.1983, leg. A. Zilenko. – 1 ♂, 1 ♀, Cisokhotia, Okhotsk District, Ul'ya River, mouth of Amka River, 6.VIII.1988, leg. V. Zherikhin, I. Sukachova. – 1 ♂, near Okhotsk, airport, quagmire near bank of river, 15.VII.1987, leg. V. Zherikhin, I. Sukachiova. Further new material from South Siberia concerning *E. cristatopalpus* will be presented and discussed elsewhere (Tanasevitch, in preparation).

MISIDENTIFICATIONS: *E. tenuimana* (mislabeled as *E. cristatopalpus*), 2 ♂, 1 ♀, Austria, Carinthia, route to Mt Grossglockner, ascent to Franz Josef's Height, 2260-2300 m a.s.l., 1978-1980, leg. K. Thaler; an additional label in a vial: A: Glockner, 1750-2200 m a.s.l. – 17 ♂, 2 ♀, same locality, 1900-2580 m a.s.l., 1978-1980, leg. K. Thaler; an additional label in a vial: A: Glockner, 1750-2200 m a.s.l. – 2 ♂, 2 ♀, same locality, 1900-2580 m a.s.l., 1979, leg. K. Thaler. – 1 ♂, same locality, 1900-2580 m a.s.l., 1979, leg. K. Thaler.

E. whymperi O. P.-Cambridge, 1877 (labeled as *E. zographica*?, *tirolensis*?), 1 ♂, Mongolia, locality data illegible, June 1988, leg. S. Heimer. In spite of the fact that the exact locality is unknown, it is possible to tell confidently that this species was found in high mountains of Mongolia. The arcto-alpine *E. whymperi* was hitherto known in Eurasia only from beyond the Arctic Circle: from Vorkuta, Russia (Tanasevitch & Koponen, 2007), and from Yamal Peninsula, Russia (Tanasevitch *et al.*, 2009). This species is here reported for the first time for the Mongolian fauna.

REMARKS: *E. cristatopalpus* belongs to the *psychrophila*-group (sensu Crosby & Bishop, 1928), containing at least a dozen of very similar species, which is characterized by a high level of infraspecific variability of somatic and genitalic structures



FIGS 35-47

Apex of embolic division of *Erigone cristatopalpus* Simon, 1884 (35-38), of *E. zographica* Crosby & Bishop, 1928, holotype (AMNH) (39-41), different aspects, of *E. viabilis* Chamberlin & Ivie, 1933, holotype (AMNH) (42), of *E. remota* L.Koch, 1869 (43), of *E. whymperi* O. P.-Cambridge, 1877 (44), of *E. psychrophila* Thorell, 1872 (45), and of *E. tirolensis* L. Koch, 1872 (46, 47). (35, 36) Specimen from Foppolo, Italy, different aspects. (37) Specimen from Lake Tignes, France. (38) Specimen from Toggia, Italy. (43) Specimen from Polar Urals, Russia (CAT). (44) Specimen from Qooqqut, Greenland (ZMMU). (45) Specimen from Severnyi Island of Novaya Zemlya, Russia (ZMMU). (46, 47) Specimens from West Chukotka, Chaun River mouth (ZMMU).

that caused numerous synonyms in the group. Strong variability was found in body size, teeth arrangement on the carapace, chelicerae and palpal femur; length of the palpal tibia; size of the dorsal apophysis (sensu Muster & Hänggi, 2009) and presence/absence/size of a tubercle on the ventral lobe (= ventral apophysis auct.) of the palpal tibia; as well as shape of the dorsal plate (= central capsule, median plate *auct*.) and direction of the receptacula, see, e.g., Tanasevitch & Koponen (2007), Muster & Hänggi (2009). In contrast, shape of the embolus (see Figs 35-47), as well as of mesal and posterior tooth (sensu Crosby & Bishop, 1928) in the embolic division are more or less stable, show little variability and might be a good character for reliable distinction from similar species. The similarity and high level of variability in epigynes makes identification of females in the *psychrophila*-group very problematic. A spectrum of the variations mentioned above is represented for *E. cristatopalpus*: compare

Figs 27-31, 35-42, 48-52. Many more examples from the Siberian material will be shown and discussed elsewhere (Tanasevitch, in preparation). The detailed comparison of the type with extensive comparative material of *E. cristatopalpus*, *E. viabilis*, *E. zographica* from different part of Eurasia and the Nearctic has shown that all these undoubted belong to a single widespread species, *E. cristatopalpus*. Despite variation in palpal and body characters, the conformation of the embolic division is quite uniform throughout the whole range of the species. The small differences in shape of the embolus or mesal tooth are often a result of observation in different orientation. The structure of the epigyne is also uniform in general, but can be easily confused with that of *E. psychrophila* Thorell, 1872 and *E. whymperi*.

Erigone cristatopalpus is most similar to the Arctic *E. whymperi* and differs by the presence of a deep and wide notch in the embolic division (arrow in Figs 32, 33 cf. figs 9-14 in Tanasevitch & Koponen, 2007).

DISTRIBUTION: Europe (region of Alps), mountains of South Siberia, East Siberia, Russian Far East, the Nearctic.

RANGE: Holarctic.

Erigone dentipalpis (Wider, 1834)

MATERIAL: 1♀, Cyprus, Moniatis, 700 m a.s.l., sifting litter under *Laurus*, *Alnus* & blackberry, 13.IV.1981, leg. C. Besuchet [17]. – 1 ♂, 6 ♀, Israel, Maize, Newe Yaar, summer 1986, leg. S. Heimer.

REMARKS: This species is here reported for the first time for the Cypriot and Israeli faunas.

RANGE: Holarctic.

Erigone remota L. Koch, 1869

MATERIAL: 1 ♂, 1 ♀; 1 ♂ (ZMMU), Italy, Aosta Valley, near Rutor Glacier, 2650 m a.s.l., under stones, VIII.1980, A. Focarile [5].

RANGE: Palaearctic arcto-alpine.

Frontinellina frutetorum (C. L. Koch, 1834)

MATERIAL: 1 ♀, Greece, Crete, Lasithi, near route Lasithi - Iraklion, above bifurcation to Krasi, 570 m a.s.l., 7.V.1985, leg. C. Lienhard [Nax-85/14].

RANGE: West Palaearctic.

Gnathonarium dentatum (Wider, 1834)

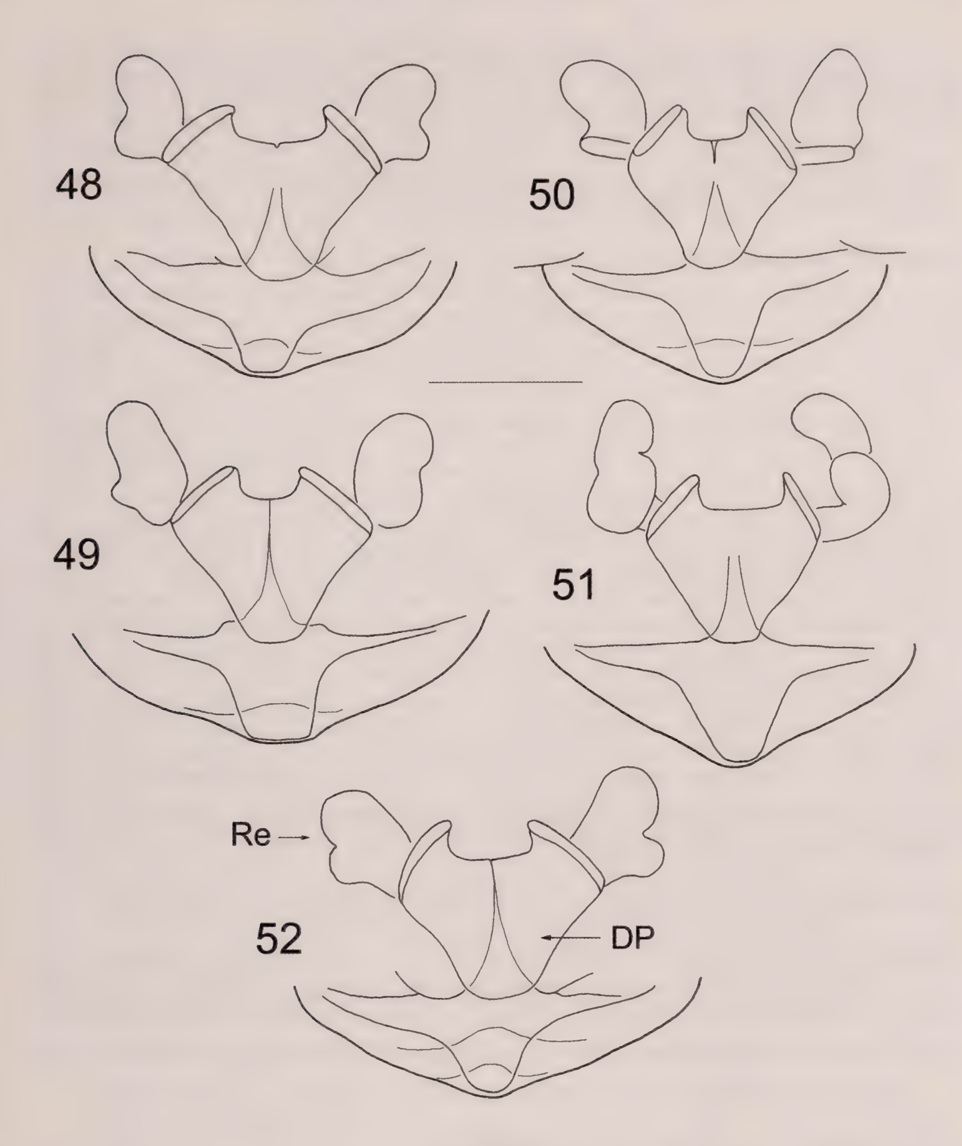
MATERIAL: 1 ♂, Italy, Sardinia, Simaxis, 20.IX.1969, leg. A. Senglet. – 1 ♀, Sicily, Palermo, Cefalu, 8.-9.VI.1974, collector unknown. – 1 ♀, Cyprus, Nicosia, irrigation canal, 10.VII.1977, leg. S. Vit.

REMARKS: This species is here reported for the first time for the Cypriot fauna.

RANGE: Palaearctic.

Gonatium nemorivagum (O. P.-Cambridge, 1875)

Gonatium hilare (Thorell, 1875) sensu Eskov, 1992: 55, misidentification, examined.



FIGS 48-52

Erigone cristatopalpus Simon, 1884, epigyne, dorsal view. (48, 49) Specimens from Toggia, Italy. (50, 51) Specimens from Lake Tignes, France. (52) Specimen from Foppolo, Italy.

MATERIAL: 1 ♀, Greece, Samos, SW of Karlovasi, near cloister "Kimisos Theodoki", Kosmadei, 600-650 m a.s.l., *Pinus* forest, 24.XI.1991, leg. C. Lienhard [ZS-91/53].

REMARKS: This species is here reported for the first time for the Greek fauna.

DISTRIBUTION: In view of the fact that the species is very similar to *G. hilare* (Thorell, 1875) and specimens probably have been repeatedly misidentified, its distribution is unclear now (see Millidge, 1981).

NOTE: A record of *G. hilare* from Sakhalin Island, Russia actually refers to *G. nipponicum* Millidge, 1981, earlier known from Japan only (Millidge, 1981). Thus, the known distribution of *G. hilare* is restricted to Europe.

MATERIAL EXAMINED: 1 ♀ (ZMMU, mislabeled as *G. hilare*), Russia, Sakhalin, Korsakov District, Lesnoye, 24.IX.1987, leg. A. Basarukin. – 1 ♂ subad. (ZMMU, mislabeled as *G. hilare*), Makarov District, Tsapko, 2.VIII.1987, leg. A. Basarukin.

Gongylidiellum murcidum Simon, 1884

MATERIAL: 1 ♀, Greece, Rhodes, Profitis Ilias, 650 m a.s.l., sifting litter from karst depression, 11.IV.1977, leg. C. Besuchet [7b]. – 2 ♀, Samos, 3 km W of Pirgos, 400 m a.s.l., sifting litter under *Platanus*, 14.V.1985, leg. C. Besuchet [4b]. – Cyprus, ca 60 ♂ & ♀, Ayios Dhimitrios, 600 m a.s.l., sifting litter under *Quercus* in ravine, 9.VII.1977, leg. C. Besuchet [2a]. – 2 ♂, ca 60 ♀, same locality, 700 m a.s.l., sifting litter, 9.VII.1977, leg. S.Vit [c/15]. – 1 ♂, 3 ♀, above Ayios Dhimitrios, sifting litter under *Platanus, Alnus* & *Quercus*, 11.IV.1981, leg. C. Besuchet [12b]. – 2 ♂, 10 ♀, route Phini - Ayios Dhimitrios, 4 km from Phini, sifting litter under *Platanus, Alnus* & *Quercus*, 13.IV.1981, leg. C. Besuchet [16b]. – 19 ♀, Cedar Valley, 1200 m a.s.l., sifting litter, 24.VII.1977, leg. C. Besuchet [42]. – 2 ♂, 1 ♀, Maa (Coral Bay), on beach, under stones, 19.IV.1981, leg. C. Besuchet [27b]. – ca 60 ♀, 6 km NE of Larnaca (Hotel Lordos Beach), on beach, under stones, 6.IV.1981, leg. C. Besuchet [2]. – 13 ♀, 3 km S of Prodhromos, 1500 m a.s.l., bank of brook, under stones, 10.IV.1981, leg. C. Besuchet [11a]. – 3 ♀, Pano Platres, 1200 m a.s.l., sifting litter under *Platanus* & *Pinus*, 14.IV.1981, leg. C. Besuchet [19]. – 47 ♀, Nicosia, Alonoudhi Junction, 600 m a.s.l., sifting litter under *Platanus*, 15.VII.1977, leg. S. Vit [c/27]. – 2 ♀, Turkey, Artvin, between Borçka and Artvin, bank of Coruh River, 200 m a.s.l., under stones, sifting litter under *Tamarix*, 8.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [9]. – 4 ♀, 8 km W of Borçka, 350 m a.s.l., deciduous forest, sifting litter, 8.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [8]. – 4 ♂, 7 ♀, Lebanon, Hasroun near Bsharri, 1500 m a.s.l., sifting dry leaf litter, 3.IV.1975, leg. C. Besuchet [14b]. – 1 ♀, near Bsharri, 1950-2000 m a.s.l., sifting dry leaf litter under *Cedrus* & *Salix*, 2.IV.1975, leg. C. Besuchet [13b].

REMARKS: This species is here reported for the first time for the Greek and Cypriot faunas.

RANGE: West Palaearctic.

Gongylidiellum vivum (O. P.-Cambridge, 1875)

MATERIAL: 1 ♀, Turkey, Artvin, between Hopa and Kemalpasa, 11 km from Hopa, sifting litter under ferns and blackberry, 10.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [12a].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: European.

Gongylidiellum orduense Wunderlich, 1995 Figs 53-58

MATERIAL: 1 ♂, 1 ♀, Turkey, Kastamonu, 5 km S of Küre, 1200 m a.s.l., *Fagus* & *Picea* forest, sifting litter, 18.V.1976, leg. C. Besuchet & I. Löbl [24]. – 1 ♀, between Inebolu and Sure, 10 km from Küre, 700 m a.s.l., *Fagus* & *Picea* forest with *Rhododendron*, sifting litter, 18.V.1976, leg. C. Besuchet & I. Löbl [22]. – 3 ♀ (ZMMU), Sinop, near Lala, *Quercus* & *Fagus* forest, sifting litter, 20.V.1976, leg. C. Besuchet & I. Löbl [28]. – 2 ♀, above Bektas, 23 km N of Boyabat, route Boyabat - Sinop, 1100 m a.s.l., *Fagus* forest, sifting litter, 20.V.1976, leg. C. Besuchet & I. Löbl [31]. – 1 ♂, 4 ♀, Zonguldak, 17 km N of Safranbolu, route Bartin - Safranbolu, 1000 m a.s.l., *Fagus* forest with *Picea* & *Pinus*, sifting litter, 16.V.1976, leg. C. Besuchet & I. Löbl [18]. – 1 ♀, 10 km from Zonguldak, route Zonguldak - Çaycuma, 500 m a.s.l., *Fagus* forest with *Rhododendron*, sifting litter, 23.V.1976, leg. C. Besuchet & I. Löbl [35]. – 1 ♀, Artvin, 8 km W of Borçka, 350 m a.s.l., deciduous forest, sifting litter, 8.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [8]. – 1 ♀, SW of Artvin, 1900 m a.s.l., pasture in *Fagus* &

Picea forest, under stones, 9.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [10a]. – 2 ♀, above Artvin, 1500 m a.s.l., *Fagus* & *Picea* forest with *Rhododendron*, sifting litter, 9.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [11b]. – 1 ♀, between Hopa and Kemalpasa, 11 km from Hopa, sifting litter under ferns and blackberry, 10.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [12a].

REMARKS: This species has been described from Anatolia, Turkey, from a single male. A description of the female is given below for the first time.

DESCRIPTION OF FEMALE: Total length 1.98. Carapace unmodified, 0.82 long, 0.57 wide, pale brown. Chelicerae 0.35 long, frontal tooth absent. Legs pale brown. Leg I 1.92 long (0.55+0.22+0.45+0.38+0.32), IV 1.93 long (0.55+0.20+0.50+0.38+ 0.30). Chaetotaxy: 2.2.1.1, spines about as long as diameter of tibia or a bit longer. TmI 0.38. Metatarsus IV without trichobothrium. Abdomen 1.27 long, 0.82 wide, pale grey. Epigyne with highly pigmented and well protruded drop-shaped ventral plate as in Fig. 58. Receptacles small, spherical.

SHORT DESCRIPTION OF MALE: Total length 1.50. Carapace unmodified, 0.70 long, 0.55 wide. Chelicerae 0.30 long, frontal tooth position as in Fig. 53. Leg I 1.92 long (0.55+0.20+0.48+0.38+0.31), IV 1.87 long (0.53+0.20+0.48+0.38+0.28). TmI 0.37. Palp as in Figs 54-57. Abdomen 0.78 long, 0.50 wide. Body and leg coloration, as well as chaetotaxy, as in female.

DISTRIBUTION: This species is still known from northern Turkey only.

RANGE: Anatolian.

Icariella hauseri Brignoli, 1979

MATERIAL: 1 ♀, Greece, Ikaria, above Aghios Kirikos, Metallio, in old mine, 30 m a.s.l., 23.XI.1991, leg. B. Hauser [ZS-91/46]. – 8 ♀, same locality, 23.XI.1991, leg. B. Hauser [ZS-91/45].

DISTRIBUTION: This species is still known from the Greek island of Ikaria only.

Improphantes cypriot sp. n. Figs 59-64

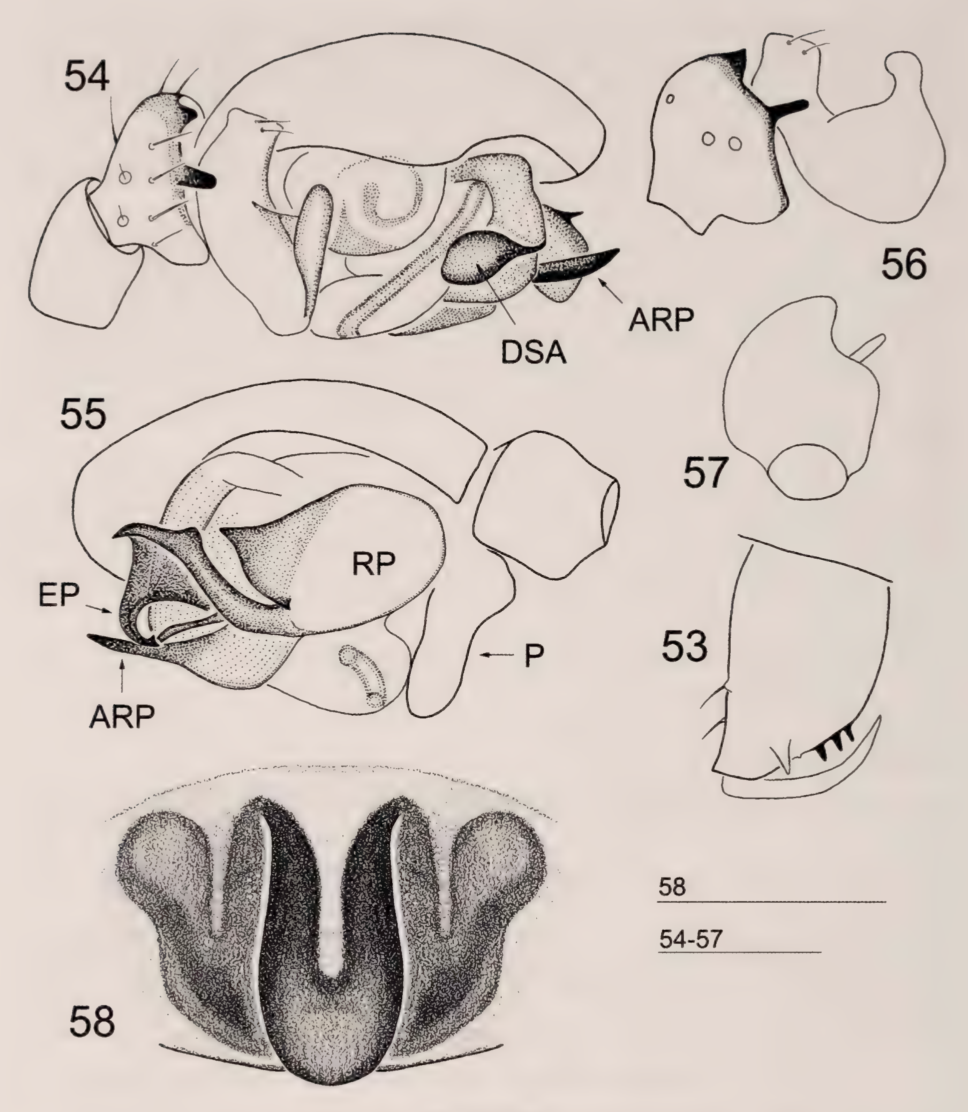
HOLOTYPE: ♂, Cyprus, Larnaca, N of airport, sifting litter along a canal, 5.IV.1981, leg. C. Besuchet [1].

PARATYPE: 1 ♂, Cyprus, SW of Kumayli, alluvial deposits, 9.IV.1998, leg. S. Vit [98-4a].

ETYMOLOGY: The specific name, a noun, refers to an inhabitant of Cyprus.

DIAGNOSIS: The species is characterised by the circular saw-shaped lamella characteristica.

DESCRIPTION: Male paratype. Total length 1.63. Carapace unmodified, 0.73 long, 0.63 wide, greyish yellow. Chelicerae 0.28 long. Legs yellow, leg I 3.15 long (0.78+0.23+0.83+0.78+0.53), IV 3.19 (0.88+0.20+0.83+0.78+0.50). Chaetotaxy: FeI-IV: 0-0-0-0; TiI: 2-1-1-0; II: 2-0-1-0, III-IV: 2-0-0-0; MtI-III: 1-0-0-0, IV: 0-0-0-0. TmI 0.18. Palp (Figs 59-64): Cymbium without posterodorsal outgrowth. Paracymbium with a strong tooth in middle part. Lamella characteristica short, distally circular saw-shaped. Radix with a spear-shaped outgrowth near base of lamella characteristica. Embolus with a poorly expressed thumb and small but distinct carina. Abdomen 0.93 long, 0.50 wide, grey.



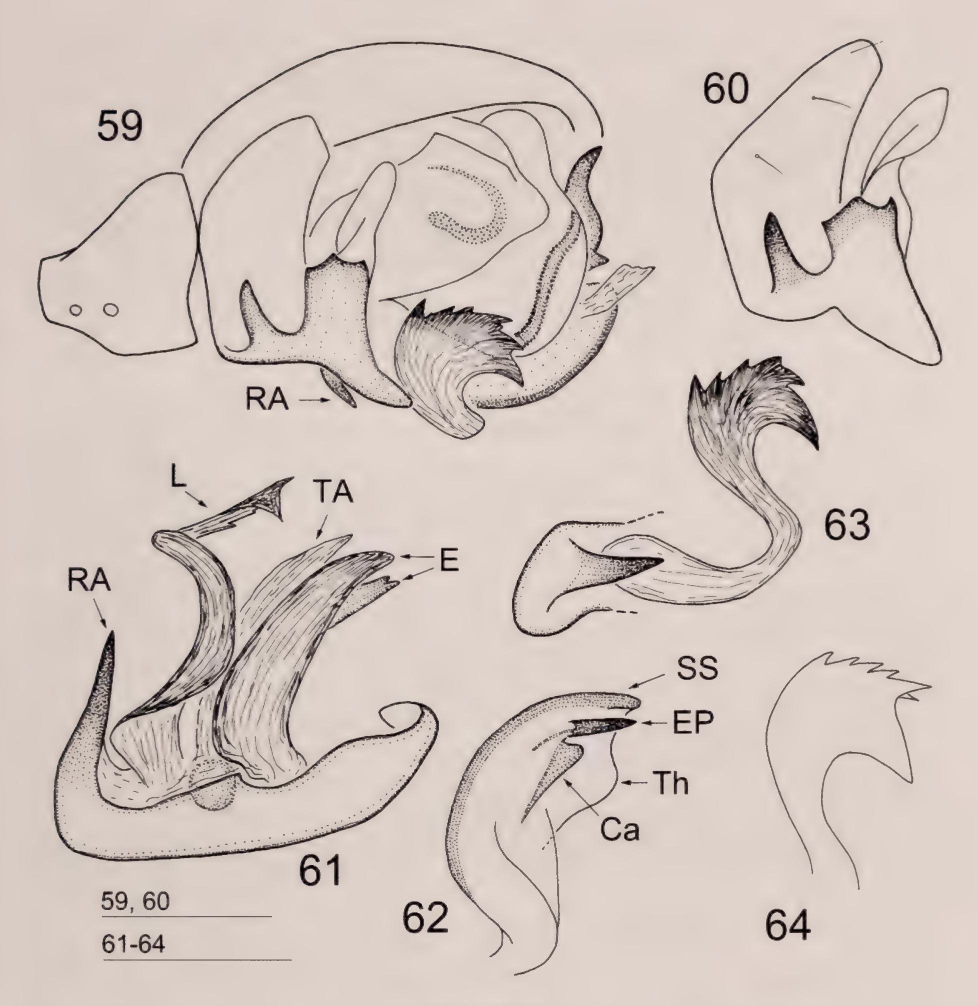
FIGS 53-58

Gongylidiellum orduense Wunderlich, 1995, ♂ and ♀ from Küre, Turkey. (53) Male chelicera, frontal view. (54, 55) Right palp, retrolateral and prolateral view, respectively. (56) Palpal tibia and paracymbium, lateral view. (57) Palpal tibia, dorsal view. (58) Epigyne, ventral view.

VARIABILITY: The number of teeth and their arrangement in distal part of the lamella characteristica differs in different specimens and even on the left and right palp of the same animal.

TAXONOMIC REMARKS: The new species is most similar to *I. turok* sp. n., see below.

DISTRIBUTION: Known from Cyprus only.



FIGS 59-64

Improphantes cypriot sp. n., ♂ paratype from Kumayli, Cyprus. (59) Right palp, retrolateral view. (60) Paracymbium, lateral view. (61) Embolic division. (62) Embolus. (63, 64) Lamella characteristica, different aspects.

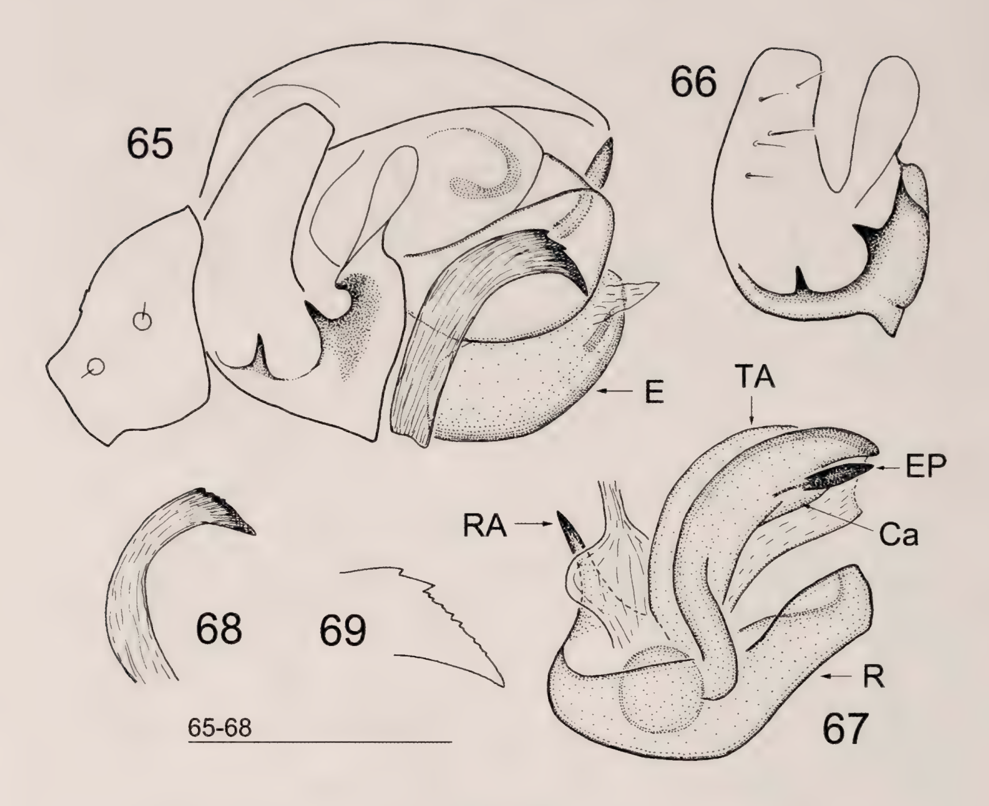
Improphantes turok sp. n. Figs 65-69

HOLOTYPE: ♂, Turkey, Antalya, Chaine Ak Daglari, E of Fethiye, 900 m a.s.l., sifting litter, 11.IV.1993, leg. S. Vit [4].

ETYMOLOGY: The specific name "turok", a noun, is latinization of the Russian word for "Turk".

DIAGNOSIS: The species is characterised by small size, as well as by the peculiar shape of the lamella characteristica and the paracymbium.

DESCRIPTION: Male. Total length approximately 1.30. Carapace unmodified, 0.60 long, 0.50 wide, yellow, with a narrow dark margin. Chelicerae 0.22 long. Legs



Figs 65-69

Improphantes turok sp. n., ♂ holotype. (65) Right palp, retrolateral view. (66) Paracymbium, lateral view. (67) Embolic division. (68) Lamella characteristica. (69) Apex of lamella characteristica (not to scale).

mostly broken off. Leg IV 2.66 long (0.70+0.17+0.67+0.67+0.45). Chaetotaxy unknown. Palp (Figs 65-69): Cymbium without posterodorsal outgrowth. Paracymbium U-shaped, posterior and anterior pockets each with a weakly sclerotized tooth. Radix with a spear-shaped outgrowth at base of lamella characteristica. Lamella characteristica like a slightly curved band slantwise cut at end. Embolus with a narrow carina and poorly expressed membraneous thumb. Fickert's gland relatively large, spherical. Abdomen crumpled, dark grey.

Female unknown.

Taxonomic remarks: This species is similar to *I. cypriot* sp. n., but well distinguishable by the peculiar shape of the lamella characteristica and the paracymbium. *I. cypriot* sp. n. and *I. turok* sp. n. differ from all (?) other known congeners by the presence of a spear-shaped outgrowth on the radix. The same kind of the radical apophysis is present in the representatives of the Central Asian genus *Tchatkalophantes* Tanasevitch, 2001.

Distribution: The species is known from the type locality only.

Jacksonella bidens sp. n. Figs 70-76

HOLOTYPE: ♂, Cyprus, 3 km S of Prodhromos, 1500 m a.s.l., sifting litter under *Platanus*, 10.IV.1981, leg. C. Besuchet (11b).

PARATYPES: 1 ♂, 1 ♀, Cyprus, above Ayia, 950 m a.s.l., sifting litter under *Pinus*, 12.VII.1977, leg. C. Besuchet [11a]. – 1 ♀, Paphos District, Mamonia, bank of Dhiarisos, sifting litter under *Tamarix*, 14.VII.1977, leg. S. Vit [c/26]. – 1 ♀ (epigyne only), Greece, Samos, route Kambos (E of Aghios Konstantinos) - Vourliotes, above cloister "Moni Vronda", in soil under *Pinus* sp., 520 m a.s.l., 26.XI.1991, leg. B. Hauser [ZS-91/63].

ETYMOLOGY: The specific name, a noun, refers to the armament of its chelicerae.

DIAGNOSIS: The species is characterised by the shape of the embolic division and by a very long median membrane.

DESCRIPTION: Male paratype. Total length 1.51 (holotype 1.68). Carapace unmodified, 0.75 long, 0.58 wide, brownish yellow. Chelicerae 0.38 long, with a tooth-like process as in Fig. 70. Maxillae each with a stout tooth anteriorly. Legs yellow. Leg I 2.19 long (0.63+0.18+0.55+0.48+0.35), IV 2.10 long (0.60+0.18+0.57+0.45+0.30). Chaetotaxy: 2.2.1.1, length of spines about one or two diameters of segment. TmI 0.35. Metatarsus IV without trichobothrium. Palp (Figs 71-74): Tibia unmodified. Protegulum membraneous, almost transparent. Distal suprategular apophysis sharpened distally. Median membrane like a long, narrow, almost transparent band, scarcely visible. Embolic division complex, with a large pointed anterior radical process and several small outgrowths. Embolus proper short and hook-shaped. Abdomen 0.75 long, 0.50 wide, pale grey.

Female. Total length 1.55. Carapace 0.75 long, 0.50 wide. Chelicerae 0.28 long, unmodified. Maxillae without a stout tooth. Leg I 1.99 long (0.60+0.20+0.53+0.43+0.23), IV 2.11 long (0.63+0.18+0.55+0.45+0.30). TmI 0.35. Abdomen 0.82 long, 0.50 wide. Epigyne and vulva as in Figs 75 & 76. Body and leg coloration, as well as chaetotaxy, as in male.

TAXONOMIC REMARKS: The new species differs clearly from the single known congener, *J. falconeri* (Jackson, 1908), by the presence of a stout tooth on the maxillae, by a well-developed distal suprategular apophysis, by a bigger and more complex embolic division, as well as by the shape of the epigyne.

DISTRIBUTION: Known from the islands of Cyprus and Samos only.

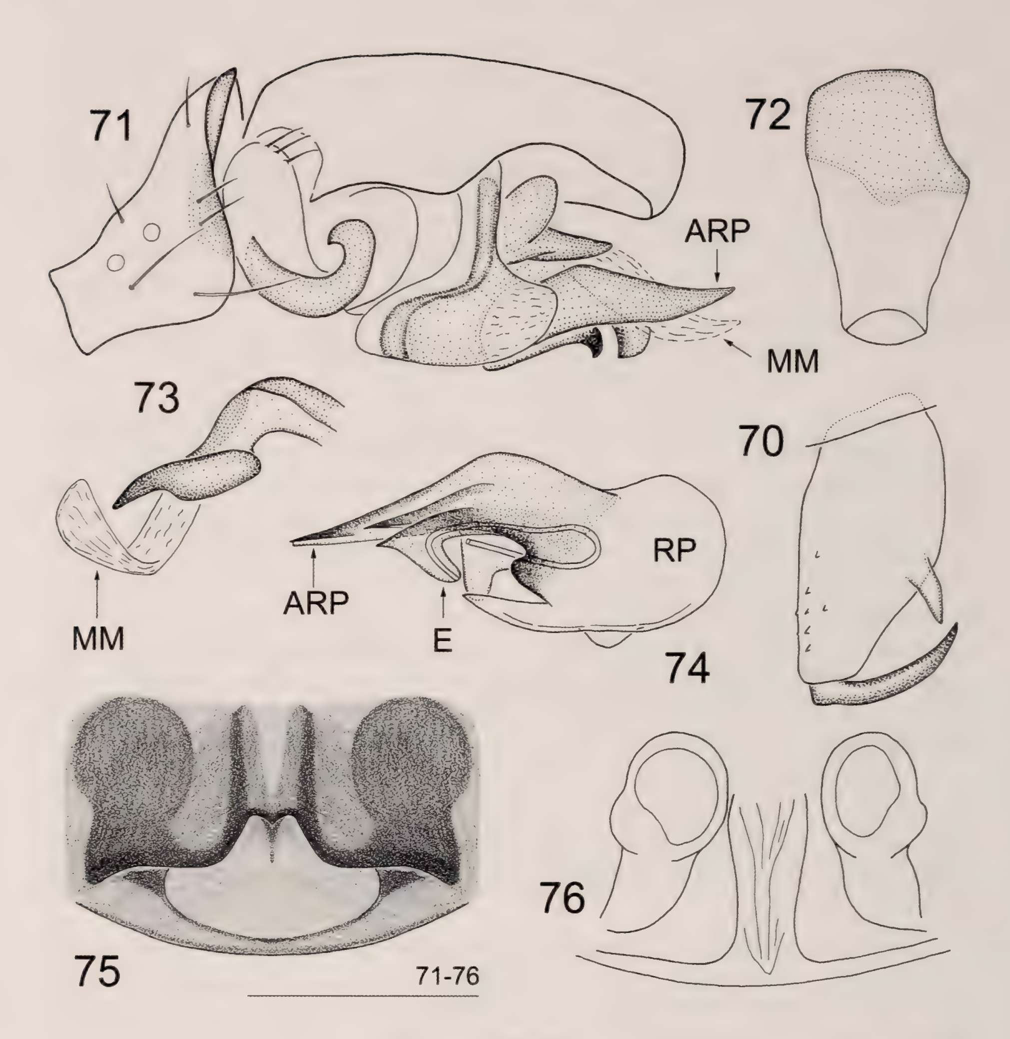
Lepthyphantes leprosus (Ohlert, 1867)

MATERIAL: 1 ♀, Greece, Ikaria, route Aghios Kirykos - Oxea, near Oxea, under stones, 500 m a.s.l., 22.XI.1991, leg. B. Hauser [ZS-91/37]. – 1 ♀, Samos, SW of Karlovasi, near cloister "Kimisos Theodoki", cave "Kako Perato", 580 m a.s.l., 24.XI.1991, leg. C. Lienhard [ZS-91/52].

RANGE: Holarctic.

Maso sundevalli (Westring, 1851)

MATERIAL: 1 ♀, Turkey, Kars, Ilgardagi Geçidi, between Damai and Posof, 2350 m a.s.l., *Betula* forest with *Sorbus*, sifting litter, 13.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [18c]. – 2 ♀, Sinop, Lala, *Quercus* forest with *Fagus*, sifting litter, 20.V.1976, leg. C. Besuchet & I. Löbl [28]. – 3 ♀, Sakarya, Serefiye, 20 km S of Adapazari, *Quercus* forest with *Tilia* & *Acer*, sifting litter, 14.V.1976, leg. C. Besuchet & I. Löbl [12].



FIGS 70-76

Jacksonella bidens sp. n., ♂ and ♀ paratypes from Ayia, Cyprus. (70) Male chelicera, frontal view. (71) Right palp, retrolateral view. (72) Palpal tibia, dorsal view. (73) Distal suprategular apophysis and median membrane. (74) Embolic division. (75, 76) Epigyne and vulva, respectively, ventral view.

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: Holarctic.

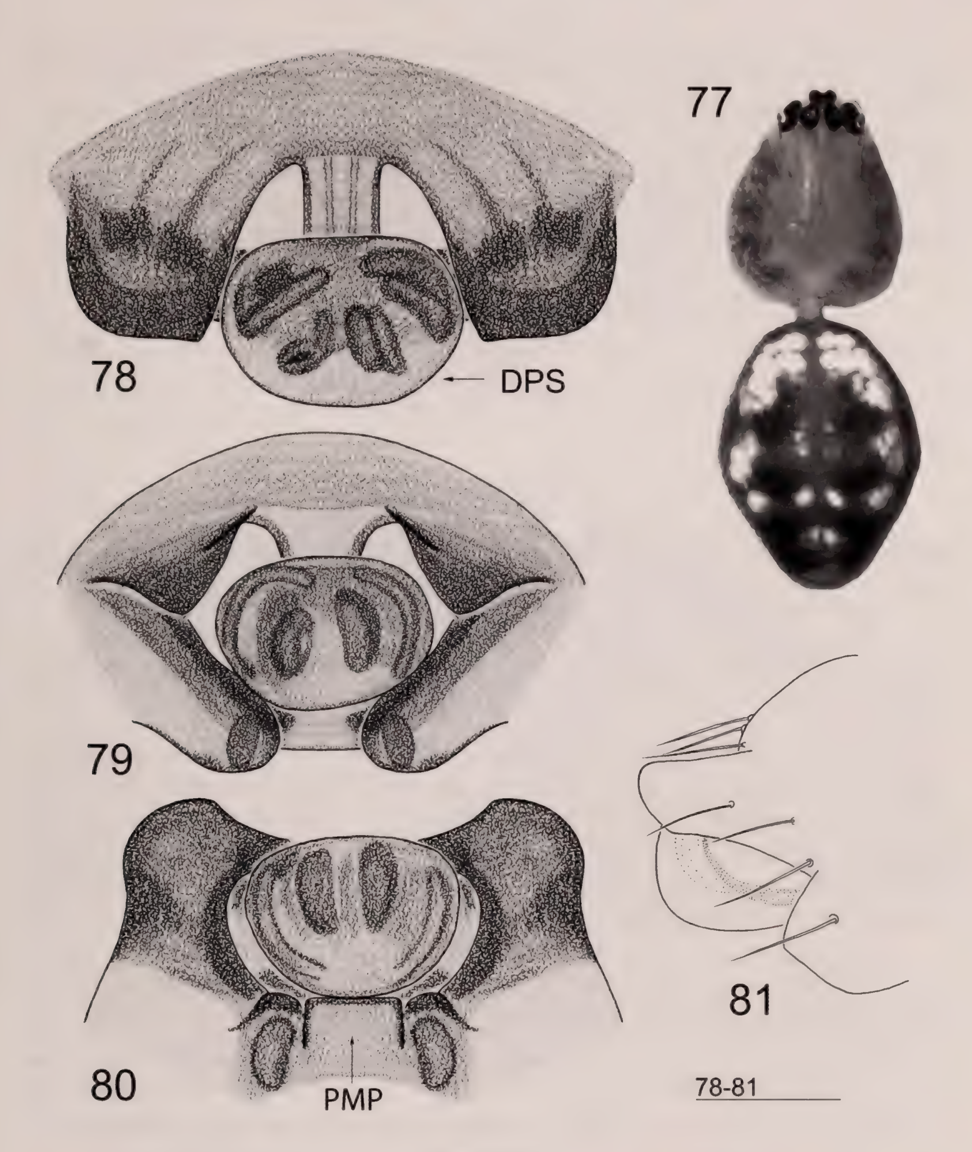
Mecynargus paetulus (O. P.-Cambridge, 1875)

MATERIAL: 3 ♂, 1 ♀, Italy, Toggia Valley, 24.X.1967, leg. A. Comellini.

RANGE: Holarctic.

Megalepthyphantes globularis sp. n. Figs 77-81

HOLOTYPE: ♀, Turkey, Artvin, Cankurtaran Geçidi, between Borçka and Hopa, 700 m a.s.l., under stones, 8.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [7a].



FIGS 77-81

Megalepthyphantes globularis sp. n., ♀ holotype. (77) Body, dorsal view. (78-81) Epigyne, ventral, posteroventral, dorsal and lateral view, respectively.

ETYMOLOGY: The specific name, an adjective, refers to the globular shape of the distal part of the scape.

DIAGNOSIS: The species is characterised by the peculiar structure of its epigyne.

DESCRIPTION: Female. Total length 2.48. Carapace unmodified, 1.08 long, 0.80 wide, pale yellow, with a broad grey margin as in Fig. 77. Chelicerae 0.45 long. Legs yellow, without bands, with darkened end of segments. Leg I 7.35 long

(1.95+0.30+1.95+2.00+1.15), IV 5.05 long (1.50+0.25+1.30+1.30+0.70) long. Chaetotaxy: FeI: 0-1-0-0, II-IV: 0-0-0-0; TiI-IV: 2-1-1-0; MtI-IV: 1-0-0-0. TmI 0.19. Metatarsus IV without trichobothrium. Abdomen 1.43 long, 0.93 wide, abdomen pattern as in Fig. 77. Epigyne (Figs 78-81): Pseudoscape divided into two lobes by a deep notch. Distal part of scape globular, middle part short, proximal part (= proscape), as well as lateral lobes and stretcher totally reduced. Entrance grooves passing through middle part of scape, then entering backwall and running through lateral walls to the receptacles.

TAXONOMIC REMARKS: The species differs from other congeners by the totally reduced proscape and the presence of a pseudoscape. The epigyne bears some resemblance to that of the representatives of *Lidia* Saaristo & Marusik, 2004. In the absence of the corresponding male it is difficult to unambiguously place the species into any genus.

DISTRIBUTION: Known from the type locality only.

Megalepthyphantes turkeyensis Tanasevitch, Kunt & Seyyar, 2005 Fig. 82

Lepthyphantes congener (O. P.-Cambridge, 1872) sensu Kulczyński, 1908: 68, pl. 2, fig. 17; ♂ from Cyprus, misidentification.

MATERIAL: 1 ♂, 2 ♀, Cyprus, Troodos Mts, Cedar Valley, near camping, 1100 m a.s.l., under stones, 18.XI.1991, leg. B. Hauser [ZS-91/20]. – 2 ♂, 1 ♀, Ikaria, above Aghios, Metallio, stony slope, S exposition, litter and under stones, 50 m a.s.l., 23.XI.1991, leg. C. Lienhard [ZS-91/48].

REMARKS: Kulczyński (1908) described and illustrated a male from Cyprus, which he erroneously believed to be the missing male of *Lepthyphantes congener* (O. P.-Cambridge, 1872) [= *Frontinellina frutetorum* (C. L. Koch, 1834)]. The figure of a male palp of *L. congener* made by Kulczyński (1908) (Fig. 83) shows that this specimen clearly belongs to *M. turkeyensis*, not to *F. frutetorum*, as mentioned by Bosmans (1994). Compare Fig. 82 and Fig. 83.

DISTRIBUTION: Cyprus and Mersin Province, Turkey.

Metopobactrus prominulus (O. P.-Cambridge, 1872)

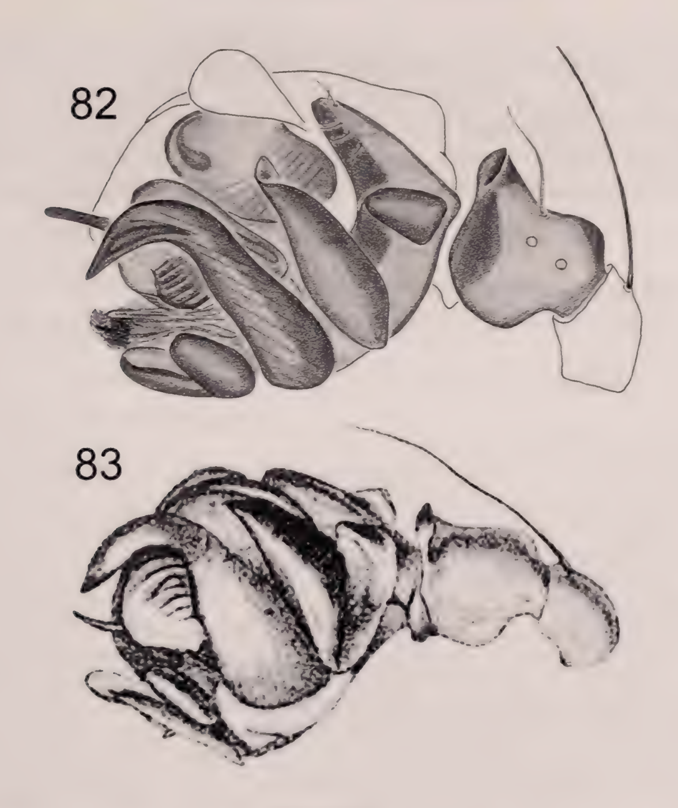
MATERIAL: 1 ♂, Turkey, Gümüshane, between Erzincan and Kelkit, 30 km from Erzincan, 2100 m a.s.l., under stones, 4.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [1a].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: Holarctic.

Micrargus herbigradus (Blackwall, 1854)

MATERIAL: 1 ♂, 2 ♀, Italy, Tuscany, Mt Argentario, Maremma, 280-400 m a.s.l., sifting litter under *Quercus ilex* & *Q. suber*, 13.-14.II.1980, leg. A. Focarile. – 2 ♀, Piedmont Province, Cuneo, Mt Antorovo, 1700 m a.s.l., litter under *Alnus viridis*, 16.VI.1982, leg. A. Focarile [13]. – 1 ♀, Lombardia, Fondra, 25.VI.1966, leg. A. Comellini. – 1 ♀, Turkey, SW of Artvin, pasture in *Fagus* & *Picea* forest, 1900 m a.s.l., under stones, 9.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [10a]. – 1 ♂, Cankurtaran Geçidi, between Borçka and Hopa, deciduous forest with *Quercus*, *Castanea*, *Acer*, *Tilia*, *Alnus*, *Buxus*, sifting litter, 700 m a.s.l., 8.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [7c]. – 1 ♀, near Pirnalli, Karkal Dagi Mts, 1250 m a.s.l., sifting litter in ravine, 11.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [15b]. – 2 ♂, 2 ♀,



FIGS 82-83

Megalepthyphantes turkeyensis Tanasevitch, Kunt & Seyyar, 2005 (after Tanasevitch et al., 2005) (82) and Lepthyphantes congener (O. P.-Cambridge, 1872) (after Kulczyński, 1908) (83). Not to scale.

Kastamonu, Ilgazdag, route Kastamonu - Çankiri, Diphan, 1300 m a.s.l., 17.V.1976, leg. C. Besuchet & I. Löbl [20]. – 2 ♂, Kastamonu, 5 km S of Küre, 1200 m a.s.l., *Fagus* forest, sifting litter, 18.V.1976, leg. C. Besuchet & I. Löbl [24]. – 1 ♂, 1 ♀, 10 km from Zonguldak, route Zonguldak - Caycuma, 500 m a.s.l., *Fagus* forest with *Rhododendron*, sifting litter, 16.V.1976, leg. C. Besuchet & I. Löbl [16].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: Palaearctic.

Microctenonyx subitaneus (O. P.-Cambridge, 1875)

Archaraeoncus prospiciens (Thorell, 1875) sensu Tanasevitch, 1987: 337, fig. 73, ♀ from Kyrgyzstan, misidentification, examined.

MATERIAL: 1 ♂, Italy, Sardinia, Decimomanu, 18.IX.1969, leg. A. Senglet. – 1 ♀, Malta, without locality, 9.V.1974, leg. V. Mahnert. – 1 ♀, same locality, 13.V.1974, leg. V. Mahnert. – 1 ♀, Hagar Qim, 2.V.1976, leg. P. Strinati & V. Aellen. – 1 ♀, Greece, Etolia, Amphilochia, under stones, 29.III.1978, leg. S. Vit [13]. – 2 ♀, Cyprus, 4 km E of Ksilofagu, sifting litter in ravine, 6.IV.1981, leg. C. Besuchet [3b]. – 4 ♀; 2 ♀ (ZMMU), Lebanon, environs of Dâmoûr, valley of left tributary of Nahr ed Damour River, 6 km from branching, sifting leaf litter on bank of river after flooding, 28.III.1975, leg. C. Besuchet [5]. – 1 ♀, Mazraal Nabi Kassem, close to

confluent of Nahr el Litani, bank of river, under grass, 29.III.1975, leg. C. Besuchet [7]. – 2 ♀, Israel, Galilee, Jordan, near Ohalo (1 km S of Lake Tiberias), 200 m a.s.l., 27.IV.1982, leg. C. Besuchet & I. Löbl.

REMARKS: A drawing of the epigyne of *Archaraeoncus prospiciens* from Bishkek, Kyrgyzstan given by Tanasevitch (1987) actually refers *M. subitaneus*. This species is here reported for the first time for the Cypriot and Jordanian faunas.

RANGE: European-Ancient Mediterranean.

Microlinyphia pusilla (Sundevall, 1830)

MATERIAL: 1 ♂, Greece, Epirus, between Salaora and Arta, bank of lagoon, 28.III.1978, leg. S. Vit [19].

RANGE: Holarctic.

Microneta viaria (Blackwall, 1841)

MATERIAL: 2 ♂, 14 ♀, Italy, Tuscany, Mt Argentario, Maremma, 280-400 m a.s.l., sifting litter under *Quercus ilex* & *Q. suber*, 13.-14.II.1980, leg. A. Focarile. – 1 ♂, Greece, Thessalie, Tsagarada, 350 m a.s.l., in leaf litter, 10.IV.2004, leg. S. Vit [GR-2004, #8]. – 1 ♀, SW Turkey, of Artvin, pasture in *Fagus* & *Picea* forest, 1900 m a.s.l., under stones, 9.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [10a]. – 1 ♂, 8 km W of Borçka, 350 m a.s.l., deciduous forest, sifting litter, 8.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [8]. – 1 ♀, Gümüshane, between Erzincan and Kelkit, 30 km from Erzincan, 2100 m a.s.l., under stones, 4.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [1c]. – 1 ♀, Kastamonu, Karadere, 32 km N of Tosya, 1400 m a.s.l., *Pinus* forest, under stones, 19.V.1976, leg. C. Besuchet & I. Löbl. – 3 ♀, Ilgazdag (route Kastamonu - Çankiri), Diphan, 1300 m a.s.l., 17.V.1976, leg. C. Besuchet & I. Löbl [20]. – 1 ♂, 13 km from Agli, 1200 m a.s.l., *Quercus* forest with *Pinus*, sifting litter, 18.V.1976, leg. C. Besuchet & I. Löbl [25]. – 1 ♀, Sinop, above Bektas, 23 km N of Boyabat, route Boyabat - Sinop, 1100 m a.s.l., *Fagus* forest, sifting litter, 20.V.1976, leg. C. Besuchet & I. Löbl [31]. – 1 ♀, Bolu, Abant, 1500-1600 m a.s.l., *Fagus* forest, under stones, 22.V.1976, leg. C. Besuchet & I. Löbl [33b]. – 2 ♀, 9 km N of Mengen (route Mengen - Devrek), 750 m a.s.l., sifting leaf litter in ravine, under *Betula*, *Rhododendron*, 23.V. 1976, leg. C. Besuchet & I. Löbl [34].

REMARKS: This species is here reported for the first time for the Italian fauna.

RANGE: Holarctic.

Oedothorax apicatus (Blackwall, 1850)

MATERIAL: 1 ♂, Greece, Phthiotis, Malesina, 20.VII.1968, leg. A. Senglet [6831]. – 2 ♀, Turkey, Izmir, Çeşme, 19.IX.1988, T. Jaccoud [TR23A].

RANGE: European-Ancient Mediterranean.

Oedothorax fuscus (Blackwall, 1834)

MATERIAL: 1 ♂, 1 ♀, Italy, Zogno, 25.VI.1966, leg. A. Comellini.

RANGE: European.

Oedothorax paludigena Simon, 1926

MATERIAL: 2 ♂, 4 ♀, Greece, Epirus, between Salaora and Arta, bank of lagoon, 28.III.1978, leg. S. Vit [19].

REMARKS: This species is here reported for the first time for the Greek fauna.

RANGE: East Mediterranean.

Palliduphantes insignis (O. P.-Cambridge, 1913)

MATERIAL: 1 ♂, Greece, Euboea, route Vasilika - Istiea, near Pefki, *Pinus* sp. grove, 1.V.1987, leg. B. Hauser [Ir-87/36]. – 1 ♀, Naupactus, 14.IV.1979, leg. S. Vit. – 1 ♂, 1 ♀, Peloponnese, near Patras, under stones, 31.III.1978, leg. S. Vit [25]. – 1 ♀, Phthiotis, Malesina, 20.VII.1968, leg. A. Senglet [6831].

REMARKS: This species is here reported for the first time for the Greek fauna.

RANGE: European.

Palliduphantes khobarum (Charitonov, 1947)

MATERIAL: 1 ♀, Turkey, Anatolia, Irmasan Geçidi, Akseki, Cevizli, 100 km S of Beyş ehir, 1500 m a.s.l., 8.V.1978, leg. C. Besuchet & I. Löbl [32].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: East Mediterranean.

Palliduphantes longiseta (Simon, 1884)

MATERIAL: 2 ♀, Italy, Tuscany, Mt Argentario, Maremma, 280-400 m a.s.l., sifting litter under *Quercus ilex* & *Q. suber*, 13.-14.II.1980, leg. A. Focarile. – 1 ♀, same locality, 400 m a.s.l., sifting litter and under stones under *Quercus ilex* & *Arbutus unedo*, 14.II.1980, leg. A. Focarile.

REMARKS: This species is known from Italy only.

Palliduphantes melitensis Bosmans, 1994

MATERIAL: 1 ♂, Malta, Gozo Isl., Dwejra Point, under stones, 8.V.1974, leg. V. Mahnert.

REMARKS: This species is known from Malta only.

Pelecopsis elongata (Wider, 1834)

MATERIAL: 1 ♂, Cyprus, SW of Limassol, "Sait Lake", slope between lake and British Air Base, shaking trees and bushes, 20.XI.1991, leg. C. Lienhard [ZS-91/32]. – 1 ♀, route Polis - Bath of Aphrodite, 4.5 km from Polis, near Hotel Souli, shaking trees and bushes, 15.XI.1991, leg. C. Lienhard [ZS-91/2]. – 1 ♂, 1 ♀, near Bath of Aphrodite, 20 m a.s.l., shaking trees and bushes on beach, 16.XI.1991, leg. C. Lienhard [ZS-91/6]. – 2 ♀, Bath of Aphrodite, wet ravine, under bark of *Eucalyptus* sp., 17.XI.1991, leg. B. Hauser [ZS-91/13]. – 1 ♂, Polis, Canon above route Prodromi - Androlikon, 300 m a.s.l., under stones, 17.XI.1991, leg. B. Hauser [ZS-91/17]. – 3 ♂, 2 ♀, Dhoros, route Limassol - Troodos, 500 m a.s.l., shaking trees and bushes, 20.XI.1991, leg. C. Lienhard [ZS-91/36].

REMARKS: This species is here reported for the first time for the Cypriot fauna.

RANGE: European.

Pocadicnemis pumila (Blackwall, 1841)

MATERIAL: 2 ♀, Turkey, Artvin, Cankurtaran Geçidi, between Borçka and Hopa, 700 m a.s.l., under stones, 8.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [7a].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: Holarctic.

Prinerigone vagans (Audouin, 1826)

MATERIAL: 1 ♂, Greece, Epirus, between Salaora and Arta, bank of lagoon, 28.III.1978, leg. S. Vit [19]. – 1 ♂, Cyprus, Paphos District, Mamonia, bank of Dhiarisos, sifting litter under *Tamarix*, 14.VII.1977, leg. S. Vit [c/26].

REMARKS: This species is here reported for the first time for the Cypriot fauna.

RANGE: Southern Palaearctic, Afrotropical, Oriental, Pacific.

Scotargus pilosus Simon, 1913

MATERIAL: 1 ♂, Italy, Aosta Valley, Velde, Gressoney, Fontainemore, 1500 m a.s.l., litter under *Alnus viridis*, X.1980, leg. A. Focarile [10]. – 2 ♂, 10 ♀, Greece, Samos, SW of Karlovasi, near cloister "Kimisos Theodoki", cave "Kako Perato", 580 m a.s.l., 24.XI.1991, leg. C. Lienhard [ZS-91/52].

REMARKS: This species is here reported for the first time for the Greek fauna.

RANGE: South Palaearctic.

Sintula corniger (Blackwall, 1856)

MATERIAL: 1 ♂, Italy, Tuscany, Mt Argentario, Maremma, 280-400 m a.s.l., sifting litter under *Quercus ilex* & *Q. suber*, 13.-14.II.1980, leg. A. Focarile. – 1 ♀, Turkey, Artvin, 8 km W of Borçka, deciduous forest, sifting litter, 350 m a.s.l., 8.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [8].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: Mediterranean.

Sintula retroversus (O. P.-Cambridge, 1875)

MATERIAL: 1 ♂, 1 ♀ subad., Greece, Ikaria, route Evdilos - Petropoulion, near Xanthi, 220 m a.s.l., 22.XI.1991, leg. B. Hauser [ZS-91/43]. – 1 ♂, Cyprus, route from Fontana Amorosa, 2 km from Bath of Aphrodite, 60 m a.s.l., under stones, 17.XI.1991, leg. B. Hauser [ZS-91/8]. – 1 ♀, Bath of Aphrodite, wet ravine, under bark of *Eucalyptus* sp., 17.XI.1991, leg. B. Hauser [ZS-91/13].

REMARKS: This species is here reported for the first time for the Cypriot fauna.

RANGE: Mediterranean.

Stemonyphantes abantensis (Wunderlich, 1978)

MATERIAL: 1 ♀, Turkey, Mudurnu, Abant, 1500-1600 m a.s.l., under bark of *Abies* & *Fagus*, 22.V.1976, leg. C. Besuchet & I. Löbl [33a].

RANGE: Anatolian.

Stemonyphantes serratus sp. n. Figs 84-92

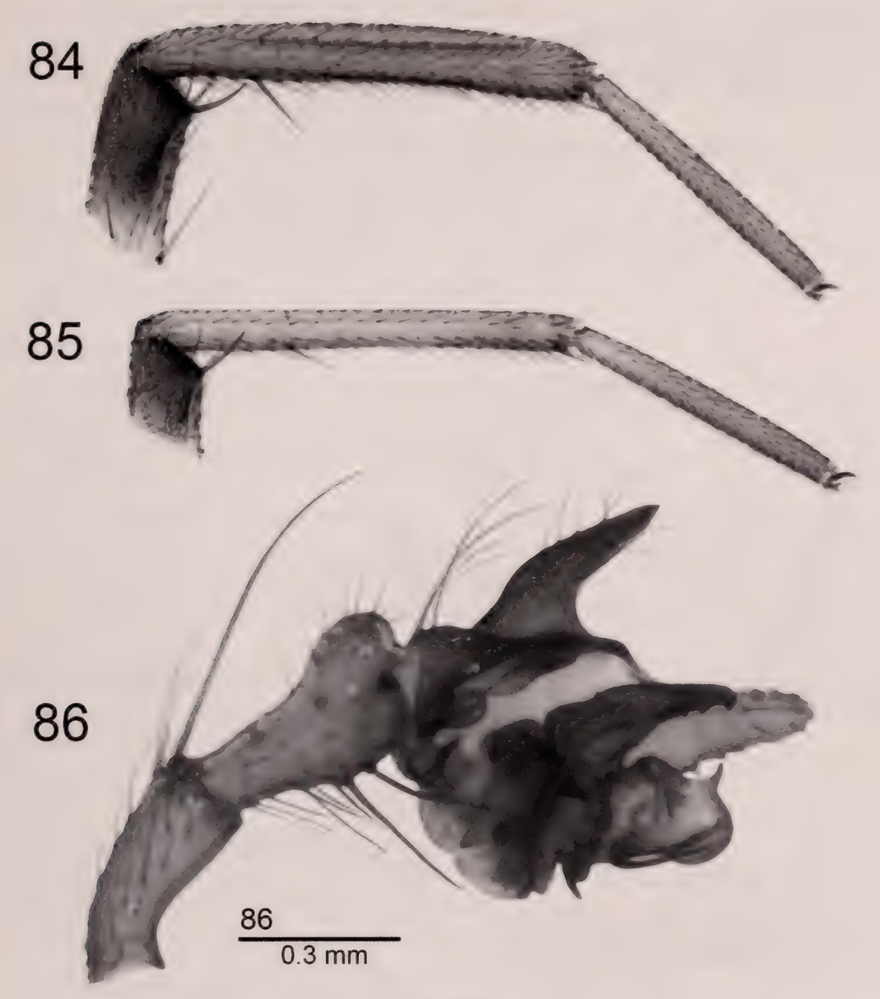
HOLOTYPE: ♂, Turkey, Bursa Province, 20 km from Bursa, 1300 m a.s.l., *Fagus* & *Pinus* forest, sifting litter, 12.V.1976, leg. C. Besuchet & I. Löbl.

PARATYPE: 1 ♂, Turkey, Bursa, Uludağ, above station, 1900-2000 m a.s.l., under stones, 12.V.1976, leg. C. Besuchet & I. Löbl.

ETYMOLOGY: The specific name, an adjective, refers to the shape of the anterior apophysis of the tegulum.

DIAGNOSIS: The species is characterised by the shape of the upper branch of the cymbium, as well as by the saw-toothed anterior tegular apophysis.

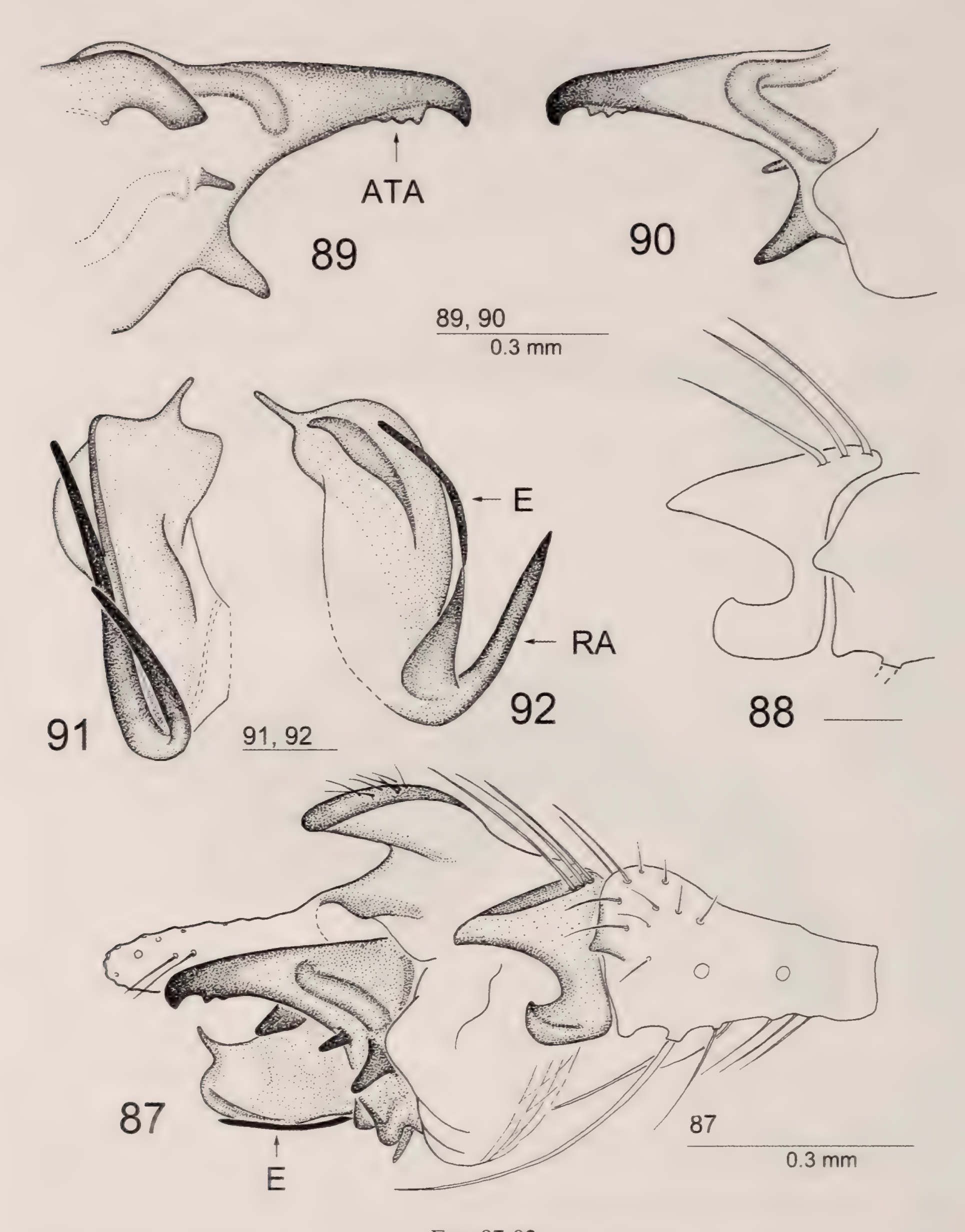
DESCRIPTION: Male paratype. Total length 4.35. Carapace 2.00 long, 1.55 wide, reddish brown, with a narrow grey margin. Chelicerae 0.75 long. Leg I 6.90 long



FIGS 84-86

Stemonyphantes serratus sp. n., ♂ paratype, from Uludağ , Turkey. (84, 85) Metatarsus I and II, respectively. (86) Right palp, retrolateral view.

(1.75+0.65+1.60+1.75+1.15), IV 7.45 long (2.00+0.55+2.00+1.90+1.00). Chaetotaxy: FeI: 2-1-0-0; II-IV: 2-0-0-0; TiI-II: 2-1-1-4, III-IV: 2-1-1-3(4-2); MtI-II: 0-0-0-2, III-IV: 0-1-1-4. MtI twice as thick as MtII, with a narrow groove on dorsal side (Figs 84 & 85). Metatarsus I-IV with a trichobothrium. TmI 0.28. Palp (Figs 86-92): Upper branch of cymbium slightly curved. Paracymbium relatively small, J-shaped, with a row of long stout spines on upper edge. Anterior tegular apophysis with hook-shaped apex and saw-toothed lower edge distally. Radix flattened, with a thin outgrowth anteriorly. Radical apophysis situated near base of embolus, long and stout, highly sclerotized. Embolus slightly shorter than radix, flattened. Abdomen 2.50 long, 1.55 wide, dorsally grey, with a dark median band flanked by paramedian spots connected to it with thin bands.



Figs 87-92

Stemonyphantes serratus sp. n., ♂ paratype, from Uludağ , Turkey. (87) Left palp, retrolateral view. (88) Paracymbium, lateral view. (89, 90) Tegulum, prolateral and retrolateral view, respectively. (91, 92). Embolic division, different aspects.

Taxonomic remarks: The new species is similar to *S. abantensis* Wunderlich, 1978 and *S. agnatus* Tanasevitch, 1990, but differs well by its curved upper branch of the cymbium, as well as by its saw-shaped anterior tegular apophysis. *S. serratus* sp. n. together with *S. abantensis*, *S. agnatus* and *S. montanus* Wunderlich, 1978 form

the *abantensis* species-group, which is characterised by a bifid cymbium, a relatively short and stout embolus, the presence of a spear-shaped apophysis on the radix at the base of the embolus (except for *S. montanus*). The *abantensis* species-group is restricted to the Anatolian-Caucasian region.

DISTRIBUTION: The species is known from the type locality only.

Tapinocyba affinis (de Lessert, 1907)

MATERIAL: 1 ♂, Italy, Falzarego, Cortina d'Ampezzo, 25.VI.1967, leg. A. Comellini.

RANGE: European.

Tapinocyba corsica (Simon, 1884)

MATERIAL: 1 ♂, 2 ♀, Italy, Latium, Colli Albani, Mt Cavo, 859-900 m a.s.l., sifting litter under *Corylus avellana* & *Castanea sativa*, 2.-3.II.1980, leg. A. Focarile.

REMARKS: This species is known from Corsica only.

Tapinocyba maureri Thaler, 1991

MATERIAL: 9 ♂, 20 ♀; 4 ♂, 6 ♀ (ZMMU), Italy, Aosta Valley, Porossan, near Aosta, 700 m a.s.l., litter under *Quercus pubescens*, 13.III.1980, leg. A. Focarile [9].

REMARKS: This species is known from Italy and Switzerland only.

Tapinocyba pallens (O. P.-Cambridge, 1872)

MATERIAL: 1 ♂, 6 ♀, Italy, Aosta Valley, Velde, Gressoney, Fontainemore, 1500 m a.s.l., litter under *Alnus viridis*, X.1980, leg. A. Focarile [10].

RANGE: European.

Tapinocyboides pygmaeus (Menge, 1869)

MATERIAL: 1 ♂, Italy, Aosta Valley, Porossan, near Aosta, 700 m a.s.l., litter under *Quercus pubescens*, 13.III.1980, leg. A. Focarile [9].

REMARKS: This species is here reported for the first time for the Italian fauna.

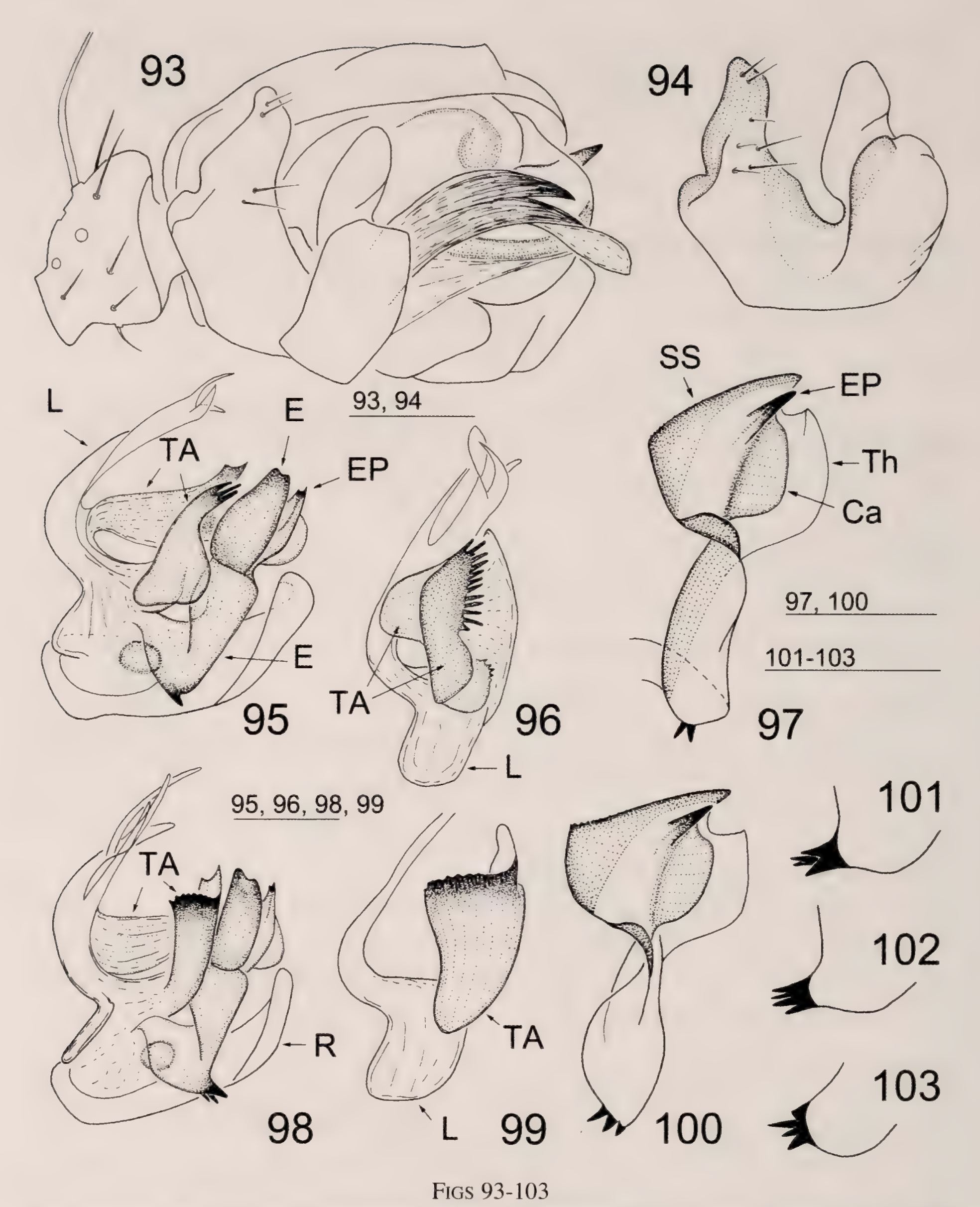
RANGE: West Palaearctic.

Tenuiphantes aff. ***aequalis*** (Tanasevitch, 1987) Figs 93-97

MATERIAL: 1 ♂, Turkey, Artvin Province, above Artvin, 1500 m a.s.l., under stones, 9.VI.1986, leg. C. Besuchet, I. Löbl & D. Burckhardt [11a].

COMPARATIVE MATERIAL EXAMINED: *T. aequalis*, 3 ♂ (CAT), Russia, Caucasus, Republic of Adygeya, environs of Guzeripl', Caucasian Nature Reserve, Mt Abago, *Abies*, *Fagus*, *Acer*, *Betula* etc. forest, up to timberline and in subalpine meadows, 1700-1850 m a.s.l., 24.-26.V.1985, leg. S. Golovatch. – 1 ♂, 1 ♀ (CAT), same locality, 2000 m a.s.l., 27.VII.1974, leg. V. Ovtsharenko. – 1 ♂, 2 ♀ (CAT), same locality, 8.VIII.1974, leg. V. Ovtsharenko. – 1 ♂, 2 ♀ (ZMMU), Russia, Caucasus, Republic of Karachay-Cherkessia, near Teberda (ca 43°27'N, 41°44'E), Teberda Nature Reserve, Mt Malaya Khatipara, IX.2008, leg. F. Martynovchenko.

REMARKS: A single male from Artvin, Turkey has the palpal conformation almost identical to that of the Caucasian *T. aequalis*. The main difference lies in the shape of the terminal apophysis: compare Figs 95, 96 with Figs 98, 99. The examination of material from the Caucasus (see below) has shown that shape of the terminal



FIGS 93-103

Tenuiphantes aff. *aequalis* (Tanasevitch, 1987), ♂ specimen from Artvin, Turkey (93-97), and *Tenuiphantes aequalis* (Tanasevitch, 1987), ♂ specimens from Mt Abago, Russia (98-103). (93) Right palp, retrolateral view. (94) Paracymbium, lateral view. (95, 98) Embolic division. (96, 99) Lamella characteristica and terminal apophysis. (97, 100) Embolus. (101-103) Basal part of embolus.

apophysis in *T. aequalis* is quite stable, but only the number (from three to four) and shape of its teeth on the embolus base are slightly variable (Figs 100-103). In the absence of conspecific female and additional male material, the taxonomic position of the specimen from Artvin is unclear.

Tenuiphantes flavipes (Blackwall, 1854)

MATERIAL: 1 ♀, Italy, Aosta Valley, Porossan, near Aosta, 700 m a.s.l., litter under *Quercus pubescens*, 13.III.1980, leg. A. Focarile [9]. – 1 ♂, Turkey, Kastamonu, between Inebolu and Sure, 10 km from Küre, 700 m a.s.l., *Fagus* forest with *Rhododendron*, sifting litter, 18.V.1976 leg. C. Besuchet & I. Löbl [22].

REMARKS: This species is here reported for the first time for the Turkish fauna.

RANGE: European.

Tenuiphantes herbicola (Simon, 1884) Figs 104-112

MATERIAL: 3 ♂, 1 ♀, Italy, Tuscany, Mt Argentario, Maremma, 280-400 m a.s.l., sifting litter under *Quercus ilex* & *Q. suber*, 13.-14.II.1980, leg. A. Focarile. – 1 ♂, Greece, Peloponnese, Messenie, Agios Dimitrios/Leuktron, 20.VIII.1970, leg. A. Senglet [7050].

COMPARATIVE MATERIAL EXAMINED: 1 ♂, France, Corsica, 15 km N of L'Ile-Rousse, wetland near Ostriconi, pitfall traps, 1.VI.1984 leg. H.G. Müller. – 2 ♂, Corsica, forest of Tartagine, near forest camp, broadleaved forest, pitfall traps, VI.1984, leg. H.G. Müller. – 2 ♀, same locality, from leaf litter, VI.1984, leg. H.G. Müller.

REMARKS: The lamella characteristica in a male from the Peloponnese, Greece differs in shape from those illustrated in the literature (Simon, 1884, 1929; Helsdingen *et al.*, 1977). A small material of *T. herbicola* from Tuscany and Corsica has shown that the shape of the lamella characteristica is really somewhat variable, but the main reason of variation for such differences lies in the different angles at which the specimens were illustrated. The shape of the posterior median plate of the epigyne is indeed different in two samples from the same population.

This species is here reported for the first time for the Greek fauna.

Tenuiphantes tenebricola (Wider, 1834)

MATERIAL: 1 ♀, Italy, Piemont Province, Cuneo, Mt Antorovo, 1700 m a.s.l., litter under *Alnus viridis*, 16.VI.1982, leg. A. Focarile [13]. – 1 ♂, 2 ♀, Lombardia, Verese Province, Mt Campo, 1100 m a.s.l., litter under *Corylus*, V.1982, leg. A. Focarile [13].

RANGE: East Palaearctic.

Tenuiphantes tenuis (Blackwall, 1852)

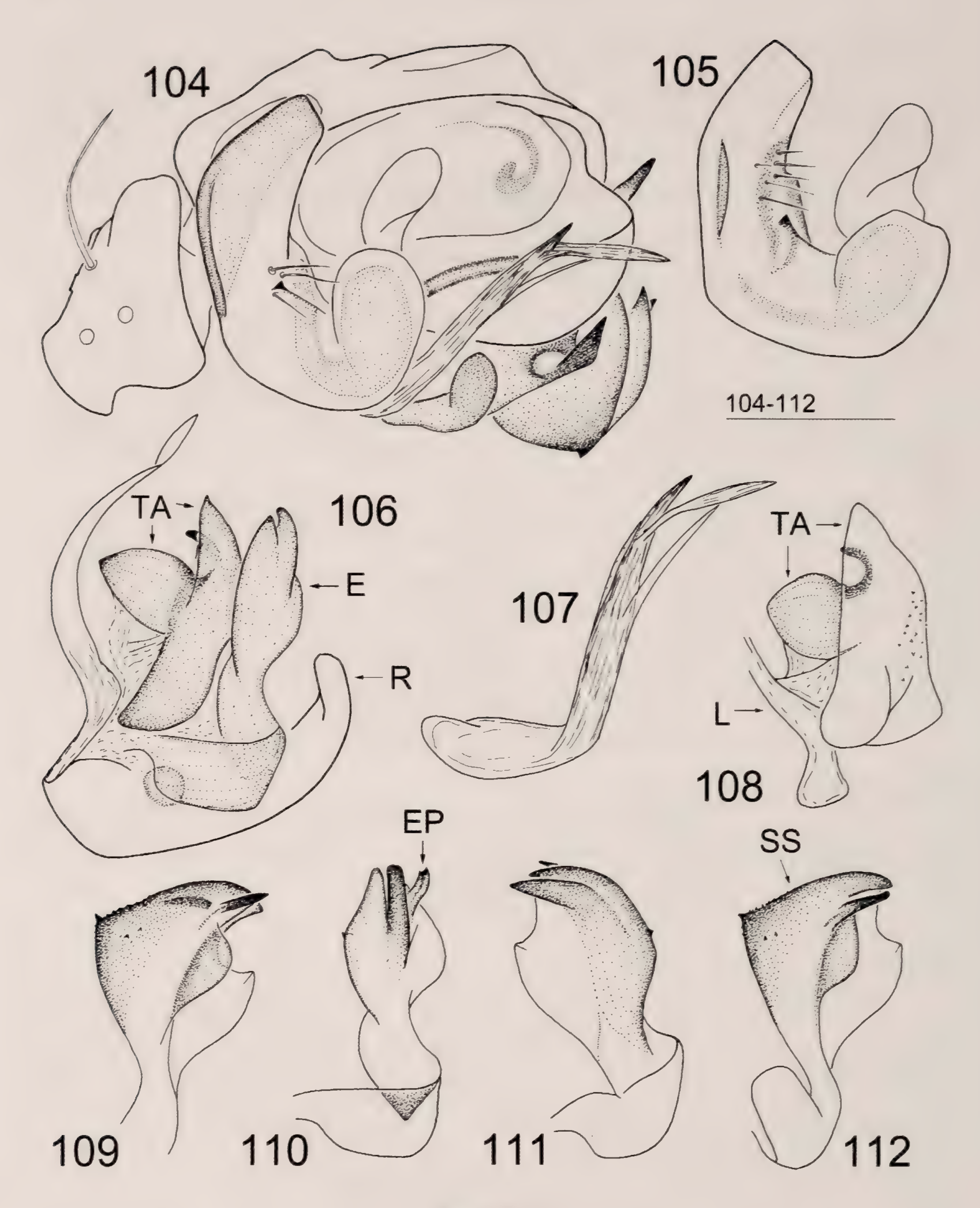
MATERIAL: 1 ♀, Greece, Naupactus, 14.IV.1979, leg. S. Vit. – 1 ♂, Crete, Rethimnon, Axos/Anogia, 3.VII.1970, leg. A. Senglet [7013]. – 1 ♀, Dariviana (35°13'N, 24°31'E), 2.X.1999, leg. A. Senglet. – 7 ♂, 14 ♀; 2 ♀ (ZMMU), Cyprus, Cedar Valley, 1200 m a.s.l., sifting litter under fern, 24.VII.1977, leg. C. Besuchet [42]. – 3 ♂, 4 ♀, same locality, 18.VII.1977, leg. C. Besuchet [27b]. – 1 ♂, 4 ♀, same locality, 15.VII.1977, leg. C. Besuchet [19]. – 1 ♀, above Ayia, 950 m a.s.l., sifting litter under *Pinus*, 12.VII.1977, leg. C. Besuchet [11a]. – 1 ♀, Limassol District, Ayios Dimitrios, 700 m a.s.l., sifting litter, 9.VII.1977, leg. S. Vit [c/15]. – 1 ♀, Nicosia, Alonoudhi Junction, 600 m a.s.l., sifting litter under *Platanus*, 15.VII.1977, leg. S. Vit [c/27]. – 1 ♀, same locality, irrigation canal, 10.VII.1977, leg. S. Vit.

REMARKS: This species is here reported for the first time for the Cypriot fauna.

RANGE: European-Ancient Mediterranean. Introduced to New Zealand (Millidge, 1988), to Chili and Argentina (Millidge, 1991), as well as to North America (Paquin *et al.*, 2010).

Troxochrus apertus sp. n. Figs 113-124

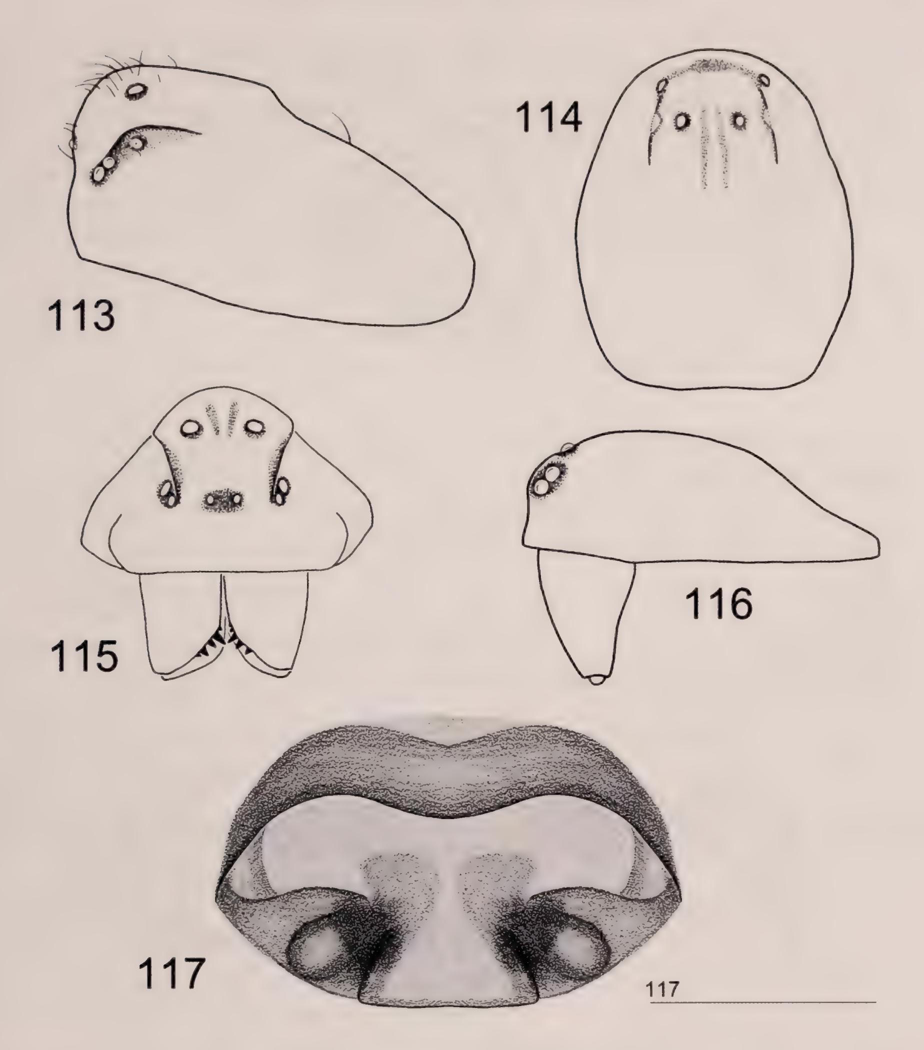
HOLOTYPE: ♂, Greece, Rhodes, Mt Kariona, 6 km W of Apollona, 400 m a.s.l., sifting litter under *Platanus*, 13.IV.1977, leg. C. Besuchet [13].



FIGS 104-112

Tenuiphantes herbicola (Simon, 1884), ♂ from Greece, Peloponnese. (104) Right palp, retro - lateral view. (105) Paracymbium, lateral view. (106) Embolic division. (107) Lamella characteristica. (108) Base of lamella characteristica and terminal apophysis. (109-112) Embolus, different aspects.

PARATYPES: 1 ♂, 14 ♀; 1 ♂, 5 ♀ (ZMMU), collected together with holotype, 13.IV.1977, leg. C. Besuchet [13]. – 3 ♀, same locality, 11.IV.1977, leg. C. Besuchet [8b]. – 4 ♀, 2 km SW of Ebonas, sifting moss and litter in ravine, 15.IV.1977, leg. C. Besuchet [15b]. – 2 ♀, Epta Pigai, sifting moss and litter in ravine, 9.IV.1977, leg. C. Besuchet [3b]. – 1 ♀, Samos, between

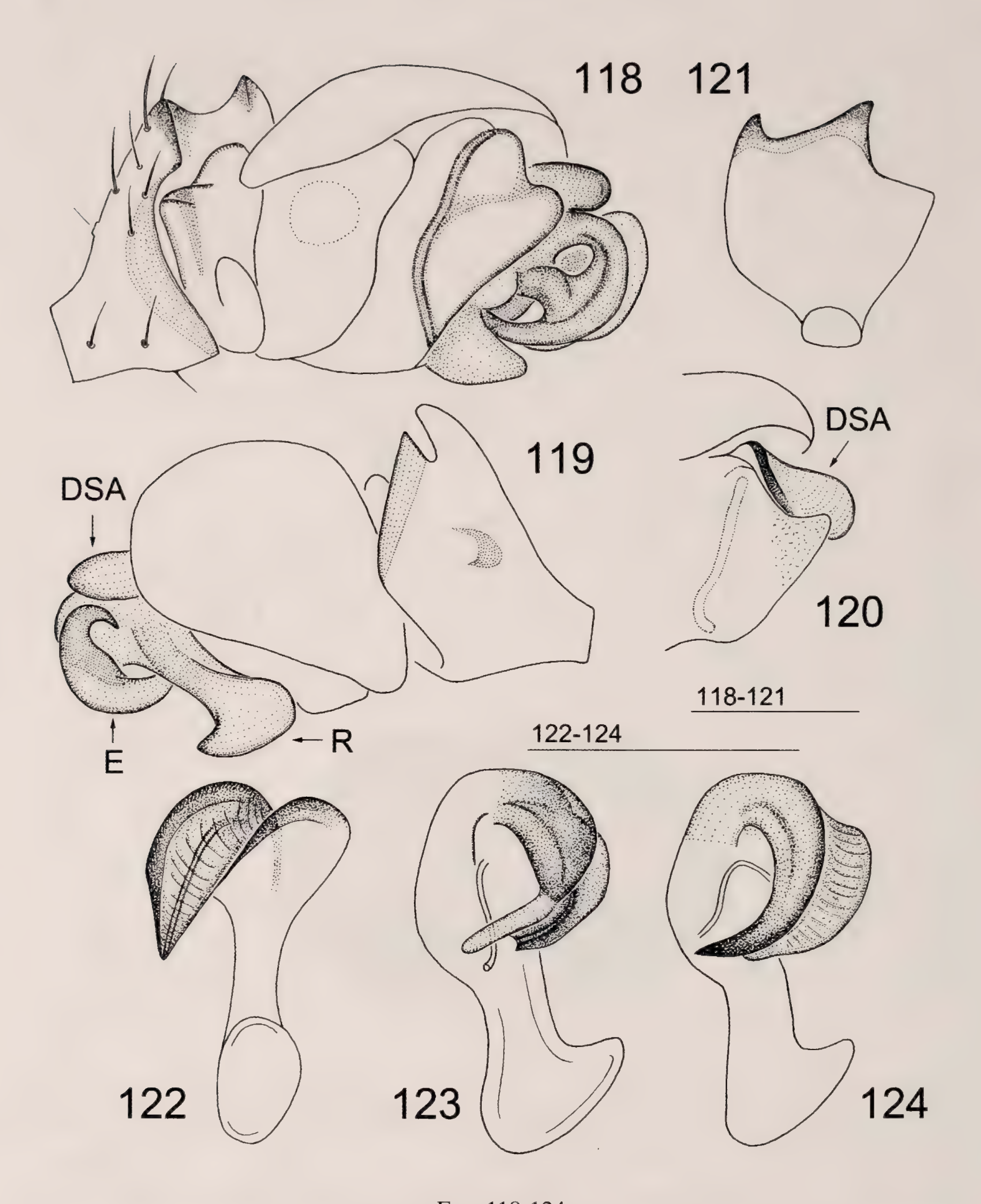


FIGS 113-117

Troxochrus apertus sp. n., ♂ paratype from Samos, Greece (113-115), and ♀ paratype from Apollona, Greece (116, 117). (113-116) Carapace, lateral view (113, 116), dorsal view (114), and frontal view (115). (117) Epigyne, ventral view.

Leka and Kastanea, near cloister "Agios Trias", 200 m a.s.l., sifting litter under *Platanus* & *Cupressus*, 16.V.1985, leg. C. Besuchet [8b]. – 1 ♂ (ZMMU), Samos, route Kambos (E of Aghios Konstantinos) - Vourliotes, above cloister "Moni Vronda", in soil under *Pinus* sp., 520 m a.s.l., 26.XI.1991, leg. B. Hauser [ZS-91/64]. – 1 ♂, 2 ♀, Turkey, Adana, Karatepe, near Kadirli, 200 m a.s.l., 1.V.1978, leg. C. Besuchet & I. Löbl [15]. – 1 ♀, same locality, 1.V.1978, leg. C. Besuchet & I. Löbl [15]. – 1 ♀, Mersin, route to Arslankoy Aladay (36°56'20N, 34°30'12E), 830 m a.s.l., 2.V.2004, leg. C. Besuchet [34]. – 1 ♀, Antalia, 12 km N of Manavgat, 26.IV.1978, leg. C. Besuchet & I. Löbl [2]. – 1 ♀, Chaine Ak Daglari, Fethiye, 900 m a.s.l., sifting litter, 11.IV.1993, leg. S. Vit [4]. – 1 ♂, Fethiye, Sinekcibeli Pass, 1000 m a.s.l., under stones, 11.IV.1993, leg. S. Vit [5].

ETYMOLOGY: The species name, an adjective, refers to the shape of the epigyne.



FIGS 118-124

Troxochrus apertus sp. n., ♂ paratype from Samos, Greece. (118, 119) Right palp, retrolateral and prolateral view, respectively. (120) Distal part of palp. (121) Palpal tibia, dorsal view. (122-124) Embolic division, different aspects.

DIAGNOSIS: The new species is characterised by the peculiar shape of the embolic division, as well as by the large and wide aperture of the epigyne.

DESCRIPTION: Male paratype. Total length 1.34. Carapace modified as shown in Figs 113-115, 0.63 long, 0.50 wide, yellow to pale brown. Chelicerae 0.25 long, un-

modified. Legs yellow. Leg I 1.58 long (0.48+0.19+0.38+0.28+0.25), IV 1.54 long (0.43+0.20+0.38+0.29+0.24). Chaetotaxy: 1.1.1.1, spines scarcely visible, very thin and short, about half of diameter of segment. TmI 0.50. Metatarsus IV without trichobothrium. Palp (Figs 118-124): Palpal tibia as long as wide, with two slanting sharpened outgrowths. Paracymbium relatively small and narrow, C-shaped. Distal suprategular apophysis short and wide, rounded distally. Embolic part of embolic dvision wide and coiled. Abdomen 0.70 long, 0.50 wide, white to pale grey.

Female. Total length 1.50. Carapace as shown in Fig. 116, 0.65 long, 0.50 wide. Chelicerae 0.25 long. Leg I 1.54 long (0.48+0.20+0.38+0.25+0.23), IV 1.60 long (0.50+0.19+0.38+0.29+0.24). TmI 0.50. Abdomen 0.93 long, 0.650 wide. Epigyne large, aperture wide, with a rounded "visor" hanging over epigynal cavity (Fig. 117). Body and leg coloration, as well as chaetotaxy, as in male.

TAXONOMIC REMARKS: The new species clearly differs from other congeners by the peculiar shape of the embolus, as well as by the very large aperture and the presence of a rounded "visor" hanging over the epigynal cavity.

DISTRIBUTION: Turkish and Greek islands near the western coast of Turkey.

RANGE: Anatolian.

Typhochrestus chiosensis Wunderlich, 1995

MATERIAL: 2 ♂, 2 ♀, Turkey, Ankara, Gölbasi, sifting humus, 750 m a.s.l., 29.X.1995, leg. S. Vit [1].

REMARKS: This species was hitherto known from Greece only. It is here reported for the first time for the Turkish fauna.

Typhochrestus ikarianus sp. n. Figs 125-129

HOLOTYPE: ♂, Greece, Ikaria, route Monokampi - Evdilos, near Monokampi, 400 m a.s.l., 22.XI.1991, leg. B. Hauser [ZS-91/39].

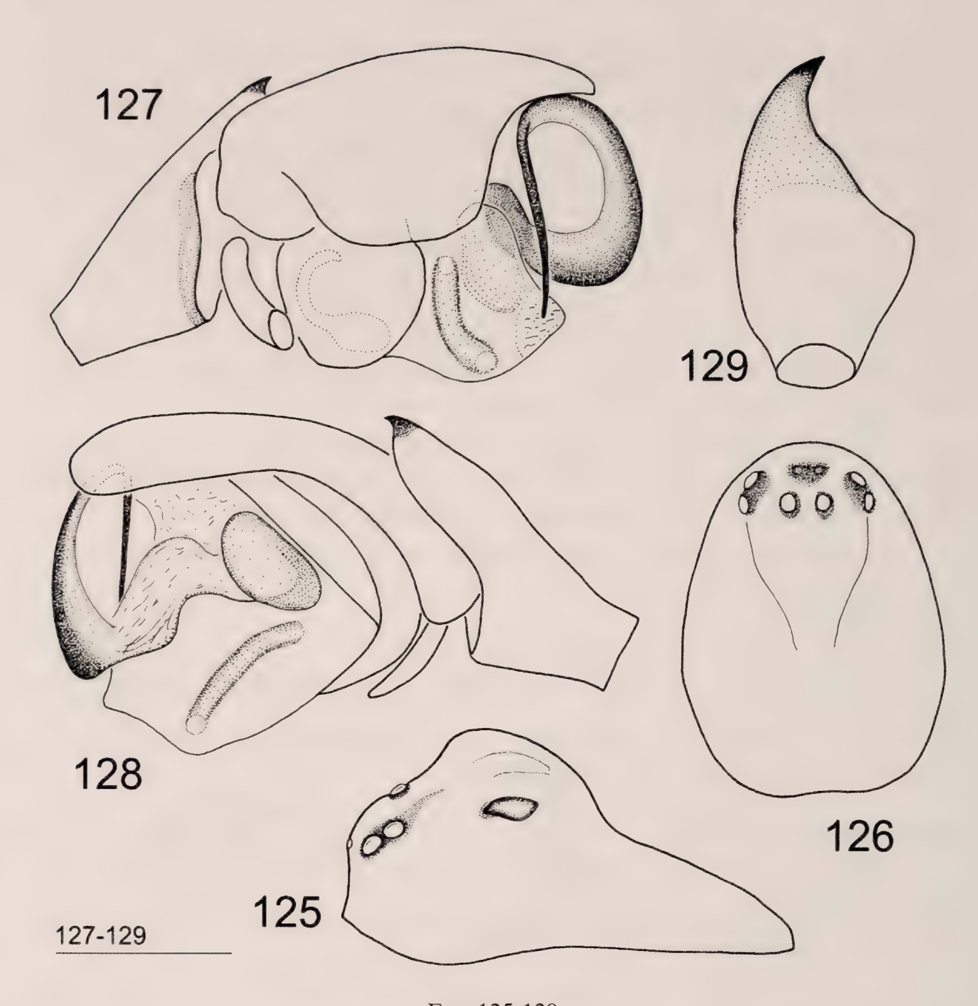
PARATYPE: 1 ♂, Greece, Ikaria, route Aghios Kirykos - Oxea, near Oxea, under stones, 500 m a.s.l., 22.XI.1991, leg. B. Hauser [ZS-91/37].

ETYMOLOGY: The specific name, an adjective, is derived from the name of the Greek island where the new species was found.

DIAGNOSIS: The species is characterised by the shape of the palpal tibia and the absence of the anterior radical process in the embolic division.

DESCRIPTION: Male paratype. Total length 1.58. Carapace modified as shown in Figs 125 & 126, 0.75 long, 0.53 wide, pale brown with indistinct radial bands. Chelicerae 0.20 long, unmodified. Both holotype and paratype have white, almost transparent (probably bleach) legs. Leg I 2.10 long (0.60+0.15+0.60+0.45+0.30), IV 2.18 long (0.60+0.18+0.60+0.50+0.30). Chaetotaxy unclear because spines lost. Trichobothria on legs not found. Palp (Figs 127-129): Distal part of palpal tibia elongated and claw-shaped. Protegulum conical, membraneous. Radix without anterior radical process. Embolus with a wide membraneous edge, coiled. Abdomen 0.83 long, 0.55 wide, grey.

TAXONOMIC REMARKS: The new species belongs to a group of species which is characterized by the absence of the tail-shaped anterior radical process and seems to be



FIGS 125-129

Typhochrestus ikarianus sp. n., ♂ paratype from Oxea, Greece. (125, 126) Carapace, lateral and dorsal view, respectively. (127, 128) Right palp, retrolateral and prolateral view, respectively. (129) Palpal tibia, dorsal view.

most similar to *T. simoni* Lessert, 1907, but well distinguished by the shape of the palpal tibia and by the absence of the lateral tooth on it.

DISTRIBUTION: Known from Ikaria Island only.

Walckenaeria alticeps (Denis, 1952)

MATERIAL: 1 ♀, Cyprus, Ayios Dhimitrios, 600 m a.s.l., sifting litter under *Quercus*, 9.VII.1977, leg. C. Besuchet [2a]. – 1 ♂, 3 ♀, near Ayios Dhimitrios, sifting moss and litter, 11.IV.1981, leg. C. Besuchet [12b]. – 1 ♀, Cedar Valley, 1200 m a.s.l., sifting litter under fern, 4.VII.1977, leg. C. Besuchet [42]. – 1 ♀, Nicosia, Alonoudhi Junction, 600 m a.s.l., litter under *Platanus*, 15.VII.1977, leg. S. Vit [c/27]. – 1 ♀, Turkey, Adana, 11 km SW of Pozanti, near Tekir, 1000 m a.s.l., sifting litter, 30.IV.1978, leg. C. Besuchet & I. Löbl [13a].

REMARKS: This species is here reported for the first time for the Cypriot and Turkish faunas.

RANGE: West Palaearctic.

Walckenaeria atrotibialis (O. P.-Cambridge, 1878)

MATERIAL: 1 ♀, Turkey, Bursa Province, near Bursa, 500 m a.s.l., *Quercus* forest with *Pinus* & *Castanea*, sifting litter, 12.V.1976, leg. C. Besuchet & I. Löbl [3]. – 1 ♂, Kastamonu, 13 km E of Agli, 1200 m a.s.l., *Quercus* forest with *Pinus*, sifting litter, 18.V.1976, leg. C. Besuchet & I. Löbl [25b].

RANGE: West Palaearctic-Nearctic.

Walckenaeria cuspidata Blackwall, 1833

MATERIAL: 1 ♀, Italy, Aosta Valley, near Rutor Glacier, 2100 m a.s.l., IX.1982, leg. A. Focarile [6].

RANGE: Palaearctic.

Walckenaeria cyprusensis Wunderlich, 1995

MATERIAL: 1 ♂, Cyprus, above Ayios Dhimitrios, sifting litter under *Platanus*, *Alnus* & *Quercus* in ravine, 11.IV.1981, leg. C. Besuchet [12b].

REMARKS: This species is known from Cyprus only.

Walckenaeria incisa (O. P.-Cambridge, 1871)

MATERIAL: 1 ♀, Greece, Attika, E of Mt Parnis, 400 m a.s.l., litter, 5.IV.1983, leg. S. Vit [19].

REMARKS: This species is here reported for the first time for the Greek fauna.

RANGE: European.

Walckenaeria monoceros (Wider, 1834)

MATERIAL: 1 ♀, Greece, Cyclades, Iraklia, cave "Aghio Ioannis", 100 m a.s.l., 11.V.1985, leg. B. Hauser [Nax-85/23].

RANGE: European-Ancient Mediterranean.

Walckenaeria stylifrons (O. P.-Cambridge, 1875)

MATERIAL: 1 ♀, Greece, Ikaria, along route Aghios Kirykos - Oxea, near Oxea, 500 m a.s.l., under stones, 22.XI.1991, leg. B. Hauser [ZS-91/37]. – 1 ♀, Samos, route Kambos - Vourliotes, above cloister "Moni Vronda", in soil under *Pinus* sp., 520 m a.s.l., 26.XI.1991, leg. B. Hauser [ZS-91/64].

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Two New Species of *Hybos* Meigen from Oriental China (Diptera, Empidoidea, Hybotidae)

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Two New Species of *Hybos* Meigen from Oriental China (Diptera, Empidoidea, Hybotidae). - The following two closely related species of the genus *Hybos* from Oriental China are described as new to science: *Hybos biancistroides* sp. n. and *Hybos yinyuhensis* sp. n. Their relationships with the morphologically similar species are discussed.

Keywords: Diptera - Hybotidae - *Hybos* - China - Hubei - new species

INTRODUCTION

The genus *Hybos* Meigen is characterized within the family Hybotidae by the long spine-like proboscis, anal cell longer than basal cell, R_{4+5} and M_1 divergent apically (Chvála, 1983; Yang & Yang, 2004). It is distributed worldwide with 164 species, of which 12 species described from the Palaearctic Region and 130 species from the Oriental Region (Yang *et al.*, 2007). The species of *Hybos* from China were revised by Yang & Yang (2004) who mentioned 85 species. Since then, another 15 species were described, and therefore, 100 species are currently known from China (Yang *et al.*, 2007). The major references dealing with *Hybos* in the Old World are Brunetti (1920), Frey (1953), Smith (1965), Saigusa (1963, 1965), Chvála (1983), Yang & Yang (2004), and Yang *et al.* (2006). In the present paper, two new species of *Hybos* are added to the fauna of Oriental China, supplementing Yang & Yang (2004).

MATERIAL AND METHODS

The specimens for this study are deposited in the following collections:

CAU = Entomological Museum of China Agricultural University, Beijing, China.
MHNG = Muséum d'histoire naturelle, Genève, Switzerland.

Basic terminology follows McAlpine (1981) and Steyskal & Knutson (1981). The following abbreviations for the setae are used: *acr* = acrostichal, *ad* = anterodorsal, *av* = anteroventral, *dc* = dorsocentral, *h* = humeral, *npl* = notopleural, *oc* = ocellar, *presc* = prescutellar, *psa* = postalar, *pv* = posteroventral, *v* = ventral.

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TAXONOMIC PART

Hybos biancistroides sp. n. Fig. 1

HOLOTYPE: Male, Hubei, Shennongjia, Yinyuhe, 18. VII. 2009, Qifei Liu (CAU).

PARATYPES: 4 males, same data as holotype (CAU & MHNG).

ETYMOLOGY: The specific name refers to two hook-like processes of the left surstylus.

DIAGNOSIS: Legs entirely black. Mid femur with one row of long, uniformly light brown pv setulae. Right surstylus thick and apically hooked medially; left surstylus with two medially directed hook-like processes, a short basal and apically a very long, medially directed one.

DESCRIPTION MALE: Body length 3.2-3.3 mm, wing length 3.2-3.3 mm.

Head: black, pale gray microtrichose. Eyes contiguous on frons; upper facets distinctly enlarged. Setae and setulae on head black; ocellar tubercle distinct, with one pair of long *oc*. Antenna black; scape bare; pedicel with a circle of subapical setulae; first flagellomere without dorsal setulae, 1.6-1.7 times as long as wide; arista black, 3.6-3.7 times as long as first flagellomere, short pubescent (longest rays shorter than basal diameter of arista) except apical 1/4 thin and bare. Proboscis black; palpus black with 3-4 long ventral setulae.

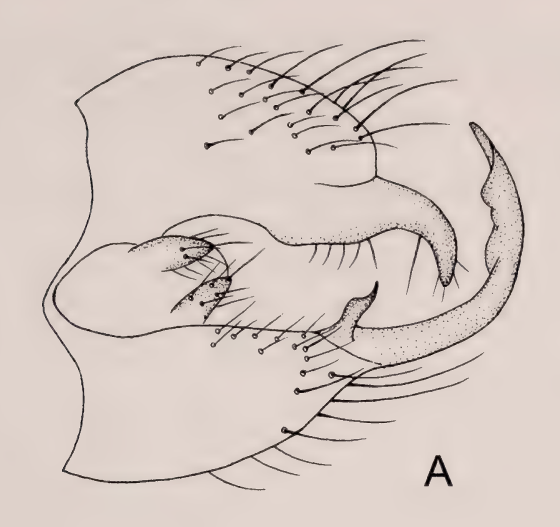
Thorax: black, pale gray microtrichose. Setae and setulae black; postpronotal lobe setulose but true *h* absent, 2 *npl* (anterior *npl* short), *acr* irregularly biseriate, 1 distinct posterior *dc* and 5-6 setulae anteriad, 1 weak *presc*, 1 long *psa*; scutellum with 2 (pairs of) short lateral setulae, 1-2 (pairs of) short apical setulae and 1 (pair of) long subapical setae. Legs entirely black. Setulae on legs light brown, setae black, except tibiae and tarsi with mostly black setulae. Fore femur 1.2 times as wide as mid femur, with one row of long *pv* setulae; mid femur with 1 preapical anterior seta and with one row of long *pv* setulae; hind femur 2.0-2.1 times as wide as mid femur, with 3-4 *ad* setae in apical half, and with 7-8 *av* (longer than *v* and *pv*), 14 *v* (6 sparse *v* on basal 1/2 and 8 dense *v* on apical 1/2), a short row of 3-5 *pv* on basal 1/4, which are spine-like and inserted on weak tubercles. Fore tibia with 1 long *ad* at middle, apically with 1 *ad* and 1 *av*; mid tibia with 3 long *ad* in one row, apically with 4 setae (1 *av* very long); hind tibia apically with 1 brownish yellow *av* and 1 long, thin preapical *ad*. Mid tarsomere 1 with two rows of short *v*; hind tarsomeres 1-2 with short ventral spines. Wing hyaline or indistinctly grayish tinged; stigma dark brown; veins dark brown, R_{4+5} and M_1 slightly divergent apically. Squama yellow, bordered with pale setulae. Halter pale yellow with dark brown base.

Abdomen: weakly curved downward, blackish, grey microtrichose. Setulae and setae pale, but few setae on hypopygium black.

Male genitalia (Fig. 1): right epandrial lobe wide with slightly concave inner margin at middle, right surstylus thick, its tip with a medially directed hook-like process; left epandrial lobe narrow with slightly convex inner margin, left surstylus long with a short basal and a long apical hook-like process, both medially directed; hypandrium distinctly longer than wide, apically distinctly narrowed toward extreme tip.

FEMALE: Unknown.

DISTRIBUTION: China (Hubei).



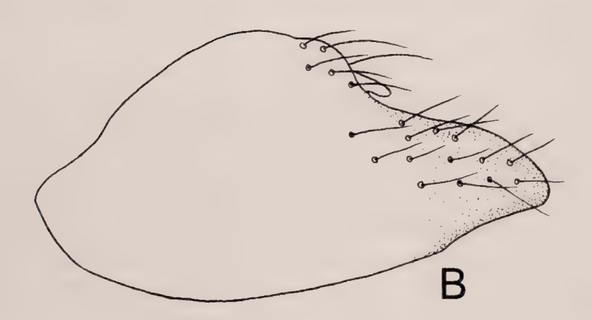


FIG. 1
Hybos biancistroides sp. n. (male). (A) Genitalia, dorsal view. (B) Hypandrium, ventral view.

REMARKS: In the key of Yang & Yang (2004) this species runs to couplet 52 which has to be modified as follows:

52. Wing hyaline or indistinctly grayish tinged 52a
    Wing grayish . . . . *H. jianfengensis*
52a. First flagellomere with several dorsal setae; arista entirely bare . . . .
    . . . . *H. tongshanensis*
    First flagellomere without any dorsal seta; base of arista pubescent . . . .
    . . . . *H. biancistroides* sp. n.

The new species may be confused with *Hybos tongshanensis* Yang & Yang, 1991 from Hubei and Guangxi, but it can be easily separated from the latter by having the first flagellomere without any dorsal seta and the base of the arista pubescent. In *H. tongshanensis*, the first flagellomere has several dorsal setae, and the arista is entirely

bare (Yang & Yang, 2004). Another morphologically similar species is *H. yinyuhensis* sp. n. (see below). The differences between the two species are given under this species.

Hybos yinyuhensis sp. n. Fig. 2

HOLOTYPE: Male, Hubei, Shennongjia, Yinyuhe, 18. VII. 2009, Qifei Liu (CAU).

PARATYPES: 3 males, same data as holotype (CAU & MHNG).

ETYMOLOGY: The specific name refers to the type locality.

DIAGNOSIS: Legs entirely black. In the middle of the row of the light brown *pv* setae on mid femur with 3-4 black setae. Right surstylus, straight, short and wide. Otherwise morphologically similar to *H. biancistroides* sp. n.

DESCRIPTION MALE: Body length 3.4-3.5 mm, wing length 3.5-3.6 mm.

Head: black, pale gray microtrichose. Eyes contiguous on frons; upper facets distinctly enlarged. Setae and setulae on head black; ocellar tubercle distinct, with one pair of long oc. Antenna black; scape bare; pedicel with a circle of subapical setulae; first flagellomere without dorsal setulae, 1.5-1.6 times as long as wide; arista black, 4.4-4.5 times as long as first flagellomere, short pubescent (longest rays shorter than basal diameter of arista) except apical 1/4 thin and bare. Proboscis black; palpus black with 3-4 long ventral setulae.

Thorax: black, pale gray microtrichose. Setae and setulae black; postpronotal lobe setuloae but true *h* absent, 2 *npl* (anterior npl short), *acr* irregularly biseriate, 1 distinct posterior *dc* and 6-7 setulae anteriad, 1 distinct *presc* (slightly shorter than posterior *dc*), 1 long *psa*; scutellum with 2 (pairs of) short lateral setulae, 2 (pairs of) short apical setulae and 1 pair of long subapical setae. Legs entirely black. Setulae on legs mostly pale, setae black. Fore femur 1.2 times as wide as mid femur, with one row of pale, long *pv* setulae; mid femur with 1 preapical anterior seta and with one row of pale, long *pv* setulae (but 3-4 pv setulae at middle black and strong); hind femur 2.3-2.7 times as wide as mid femur, with 3-4 *ad* in apical half, and with 9-10 *av* (mostly longer than *v* and *pv*), 14 *v* (7 sparse *v* on basal 1/2 and 7 dense *v* on apical 1/2), 5 *pv* on basal 1/4, which are spine-like and inserted on weak tubercles. Fore tibia with 4-5 almost dorsal setae (1 seta near middle conspicuously long), apically with 1 *ad* and 1 very long, weak *pv*; mid tibia with 3 *ad* (2 basal *ad* very long), apically with 4 setae (1 *av* very long); hind tibia apically without distinct strong setae. Mid tarsomere 1 with two rows of short *v*; hind tarsomeres 1-2 with short ventral spines. Wing hyaline; stigma dark brown; veins dark brown, R_{4+5} and M_1 indistinctly divergent apically. Squama yellow, bordered with pale setulae. Halter pale yellow with dark brown base.

Abdomen: weakly curved downward, black, gray microtrichose. Setulae and setae pale except for some black setae on hypopygium.

Male genitalia (Fig. 2): right epandrial lobe with slightly concave inner margin at middle, right surstylus straight, short and wide with a small, shining black wart-like tubercule just below; left epandrial lobe with slightly concave inner margin, left surstylus with a short, basal and a long, apical process (long process almost straight, wide and knife-like); hypandrium distinctly longer than wide, apically narrowed toward its tip.

FEMALE: Unknown.

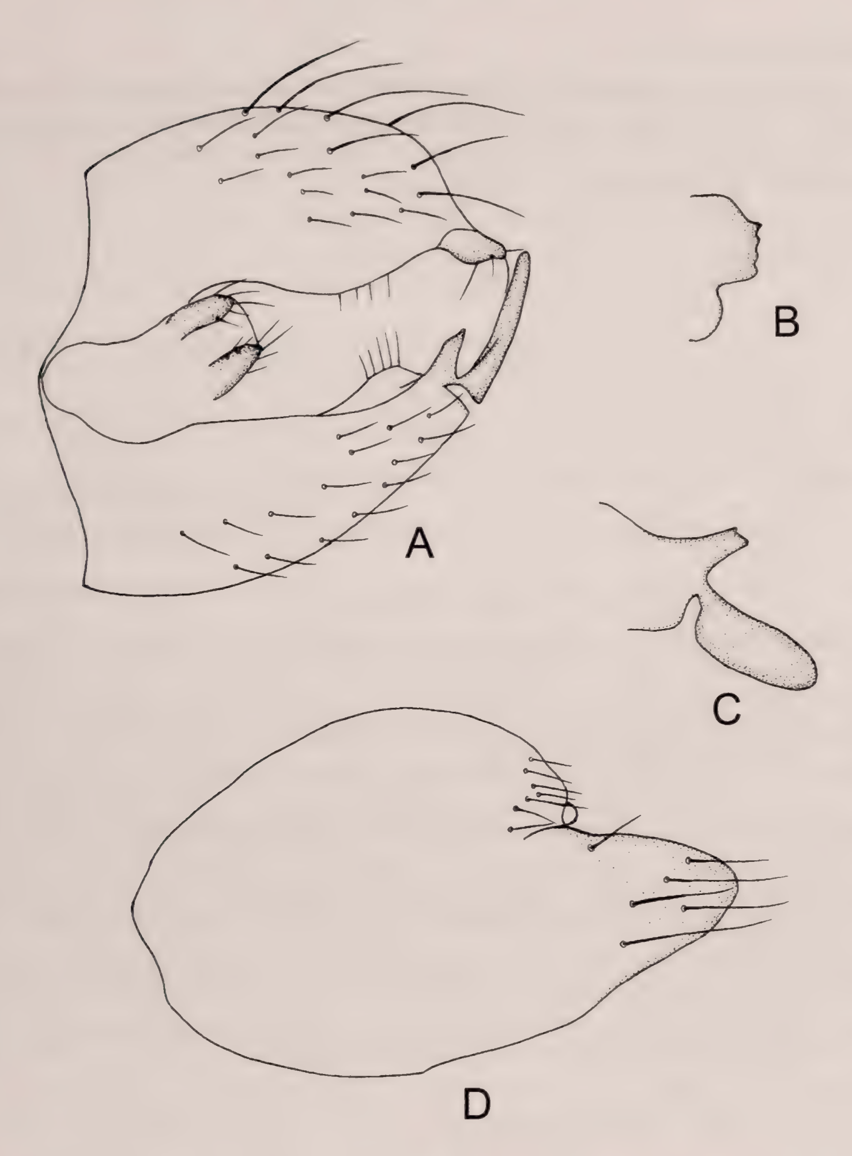


FIG. 2

Hybos yinyuhensis sp. n. (male). (A) Genitalia, dorsal view. (B) Right surstylus. (C) Left surstylus. (D) Hypandrium, ventral view.

DISTRIBUTION: China (Hubei).

REMARKS: The new species is morphologically similar to *Hybos biancistroides* sp. n., and runs to the same couplet in the key of Yang & Yang (2004), but it can be separated from the latter by 3-4 medially black pv setae on mid femur (all light brown in *H. biancistroides*), and its right surstylus which is straight, short and wide (thick and apically with a hook in *H. biancistroides*).

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New Uropodina records from Switzerland (Acari: Mesostigmata) with the description of *Discourella helvetica* n. sp.

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New Uropodina records from Switzerland (Acari: Mesostigmata) with the description of *Discourella helvetica* n. sp. - 24 Uropodina species were collected in several part of Switzerland. Eleven species are new to the fauna and one species (*Discourella helvetica* n. sp.) is new to science. Localities for all species, and description, original drawings and scanning micrographs of the new species are given.

Keywords: Acarology - turtle mites - taxonomy - faunistics.

INTRODUCTION

The Uropodina are one of the most poorly known mite groups in the soil, moss and leaf litter of the temperate zone. Some countries of Europe (e.g. Slovakia, Poland, Romania, German and Hungary) are well investigated, but the Uropodina of other European countries are poorly known. The Uropodina fauna of Switzerland belongs to the least-known in Europe; previously 36 species were reported from this country (Wiśniewski, 1993).

Investigation of the mite fauna of Switzerland started in the first part of the 20th century. The first researcher who studied the mite fauna of this country was the excellent acarologist Josef Schweizer, who presented several papers on the soil mites of the Swiss National Park; these papers contain some records of Uropodina as well (Schweizer, 1922, 1949, 1957). Schweizer (1922, 1961) described the following species from Switzerland: *Discourella dubiosa* (Schweizer, 1961), *Iphidinychus gaieri* (Schweizer, 1961), *Uropoda subterrana* (Schweizer, 1922), *Uropoda parva* (Schweizer, 1961) and *Uroseius hunzikeri* Schweizer, 1922. Some years later Hirschman (1978) described another species from this country (*Trichouropoda schweizeri* Hirschmann, 1978); after that Bühlmann (1980) presented the description of *Uroobovella jerzyi* Bühlmann, 1980 from Switzerland.

The main goal of the present paper is to contribute to the knowledge of the Uropodina fauna of Switzerland.

MATERIALS AND METHODS

The specimens were cleared with lactic acid and drawn by using a drawing tube. Scanning micrographs were taken in the Hungarian Natural History Museum, Budapest with a HITACHI SN 2600 scanning electron microscope; the specimens investigated were spatter-coated with gold-palladium. The holotype of the new species

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and most specimens of the other species are stored in alcohol and deposited in the Natural History Museum of Geneva (MHNG), the paratypes of the new species and some specimens of the other species in the Soil Zoology Collections of the Hungarian Natural History Museum, Budapest (HNHM). For identification I used Karg's (1989) and Mašán's (2001) books. The taxonomic system used is adopted from Kontschán's (2008) work except for the *Cilliba* species, which follow the system of Stachowiak *et al.* (2008). Measurements are given in micrometers (μm).

LIST OF COLLECTING SITES

AP-3 Switzerland, Appenzell, Schwägalp, sifting, 1375 m, 11.IX.1981, leg. C. Besuchet.

BE-5 Switzerland, Berne, Kirchenberg, dry leaves in mixed forest, 13.IX.1987, leg. S. Mahunka & L. Mahunka-Papp.

BE-6 Switzerland, Berne, Napf, Mettlenalp, sifting, 100 m, 10.VII.1984, leg. C. Besuchet.

BE-8 Switzerland, Berne, Uebischisee, near Thun, moss at edge of swamp border, 6.VI.1996, leg. C. Besuchet.

GE-10 Switzerland, Geneva, Allondon, Malval, root and sand, 22.X.1982, leg. C. Besuchet.

GL-1 Switzerland, Glarus, Ennenda, hollow maple, 17.IX.1987, leg. C. Besuchet.

GR-7 Switzerland, Grisons, Maloja, Lake Cavloc, sifting, 2050 m, 27.VIII.1968, leg. C. Besuchet.

JU-1 Switzerland, Jura, Damphreux, lakeside, Salix sp. and grass, 24.III.1995, leg. C. Besuchet.

LU-4 Switzerland, Lucerne, Schüpfheim, mole nests, 27.III.1979, leg. C. Besuchet.

NE-2 Switzerland, Neuchatel, Vaumarcus, at base of maples, 6.XII.1984, leg. C. Besuchet.

SG-3 Switzerland, St. Gall, Oberuzwil, mosses and reeds at edge of pond, 9.XI.1987, leg. C. Besuchet.

SH-2 Switzerland, Schaffhausen, Osterfingen, dead branches at base of oak, 11.VI.1988, leg. C. Besuchet.

TG-2 Switzerland, Thurgau, Hudelmoos near Hagenwil, peat-bog, 6.V.1989, leg. C. Besuchet.

TI-38 Switzerland, Ticino, Ascona, Monte Veritá, dead leaves and soil, 450 m, 5.XI.1982, leg. C. Besuchet.

TI-39 Switzerland, Ticino, Stabio, moss and grass at edge of Gaggiolo, 8.XI.1984, leg. C. Besuchet.

VD-7 Switzerland, Vaud, Le Séchey, Lake Ter, under willows, sifting, 1017 m, 21.VI.1989, leg. C. Besuchet.

VS-9 Switzerland, Valais, Gondo, beech forest, sifting, 800 m, 13.IX.1984, leg. C. Besuchet.

VS-12 Switzerland, Valais, Grand Saint Bernard, moss on and at base of rocks, 2150 m, 10.IX.1996, leg. C. Besuchet.

VS-18 Switzerland, Valais, Mauvoisin, at base of rock, 1800 m, 15.V.1990, leg. C. Besuchet.

LIST OF SPECIES COLLECTED

TRACHYTIDAE Trägardh, 1938

Trachytes aegrota (C. L. Koch, 1841)

LOCALITIES: VS-18, BE-5, NE-2, GL-1, SG-3, GR-7 (deposited in MHNG and HNHM).
DISTRIBUTION: Europe.

Trachytes lamda Berlese, 1904

LOCALITY: NE-2 (deposited in MHNG).
DISTRIBUTION: Europe.
REMARK: This is the first record of this species in Switzerland.

POLYASPINIDAE Berlese, 1917

Polyaspinus cylindricus Berlese, 1916

LOCALITIES: GL-1, GE-10 (deposited in MHNG).
DISTRIBUTION: Europe.
REMARK: This is the first record of this species in Switzerland.

Polyaspis sansonei Berlese, 1916

LOCALITY: TI-39, GE-10 (deposited in MHNG).
DISTRIBUTION: Germany, Italy, Poland, Slovakia.

TREMATURIDAE Berlese, 1917

Trichouropoda ovalis (C. L. Koch, 1839)

LOCALITIES: GL-1, SH-2, JU-1, TI-39 (deposited in MHNG).
DISTRIBUTION: Europe.

Trichouropoda elegans (Kramer, 1882)

LOCALITY: SH-2 (deposited in MHNG).
DISTRIBUTION: Northern and Central Europe.

Trichouropoda pecinai Hirschmann & Wiśniewski, 1986

LOCALITY: VS-18 (deposited in MHNG).
DISTRIBUTION: Slovakia.
REMARK: This is the first record of this species in Switzerland.

Nenteria ritzemai (Oudemans, 1903)

LOCALITY: VS-12 (deposited in MHNG).
DISTRIBUTION: Netherlands, Belgium, Germany.
REMARK: This is the first record of this species in Switzerland.

URODINYCHIDAE Berlese, 1917

Dinychus perforatus Kramer, 1882

LOCALITIES: VS-18, BE-6, SH-2, VS-12, AP-3 (deposited in MHNG).
DISTRIBUTION: Europe.

Dinychus inermis (C. L. Koch, 1841)

LOCALITY: VD-7 (deposited in MHNG).
DISTRIBUTION: Europe.

Dinychus bincheaecarinatus Hirschmann, Wagrowska-Adamczyk & Zirngiebl-Nicol, 1984

LOCALITY: GL-1 (deposited in MHNG).
DISTRIBUTION: France, Germany, Poland, Slovakia, Hungary.

Dinychus undulatus Sellnick, 1945

LOCALITY: JU-1 (deposited in MHNG).
DISTRIBUTION: Germany, Poland, Romania, Russia.
REMARK: This is the first record of this species in Switzerland.

Urodiaspis tecta (Kramer, 1876)

LOCALITIES: NE-2, SG-3, TG-2 (deposited in MHNG).
DISTRIBUTION: Europe.

Uroobovella pulchella (Berlese, 1904)

LOCALITY: GL-1 (deposited in MHNG).
DISTRIBUTION: Europe.
REMARK: This is the first record of this species in Switzerland.

Uroobovella minima (C. L. Koch, 1841)

LOCALITY: BE-8 (deposited in MHNG).
DISTRIBUTION: Europe.
REMARK: This is the first record of this species in Switzerland.

TRACHYUROPODIDAE Berlese, 1917

Oplitis franzi Hirschmann & Zirngiebl-Nicol, 1969

LOCALITY: BE-8 (deposited in MHNG).
DISTRIBUTION: From Spain to Poland.
REMARK: This is the first record of this species in Switzerland.

UROPODIDAE Berlese, 1900

Neodiscopoma pulcherrima (Berlese, 1903)

LOCALITIES: VS-9, TI-38, GL-1, SH-2, TI-39 (deposited in MHNG).
DISTRIBUTION: Europe.

Cilliba cassidea (Hermann, 1804)

LOCALITIES: BE-6, BE-5, NE-2, SH-2 (deposited in MHNG).
DISTRIBUTION: Europe.

Cilliba erlangensis Hirschmann & Zirnbiegl-Nicol, 1969

LOCALITIES: NE-2, JU-1 (deposited in MHNG).

DISTRIBUTION: Germany, Poland, Russia, Czech Republic, Hungary.

REMARK: This is the first record of this species in Switzerland.

Uropoda minima Kramer, 1882

LOCALITIES: SG-3, TG-2 (deposited in MHNG).

DISTRIBUTION: Europe.

Uropoda orbicularis (Müller, 1776)

LOCALITY: GR-7 (deposited in MHNG).

DISTRIBUTION: Europe.

DISCOURELLIDAE Baker & Wharton, 1952

Discourella cordieri (Berlese, 1916)

LOCALITIES: VS-9, LU-4, SH-2, GE-10, TI-39 (deposited in MHNG).

DISTRIBUTION: France, Belgium, Germany, Poland, Czech Republic.

Discourella modesta (Leonardi, 1899)

LOCALITY: VS-9 (deposited in MHNG).

DISTRIBUTION: Europe to Israel.

REMARK: This is the first record of this species in Switzerland.

Discourella helvetica sp. n. Figs 1-10

HOLOTYPE: MHNG, without registration number; female; Switzerland, Ticino, Ascona, Monte Veritá, 450 m, from dead leaves and soil; 5.XI.1982; leg. C. Besuchet.

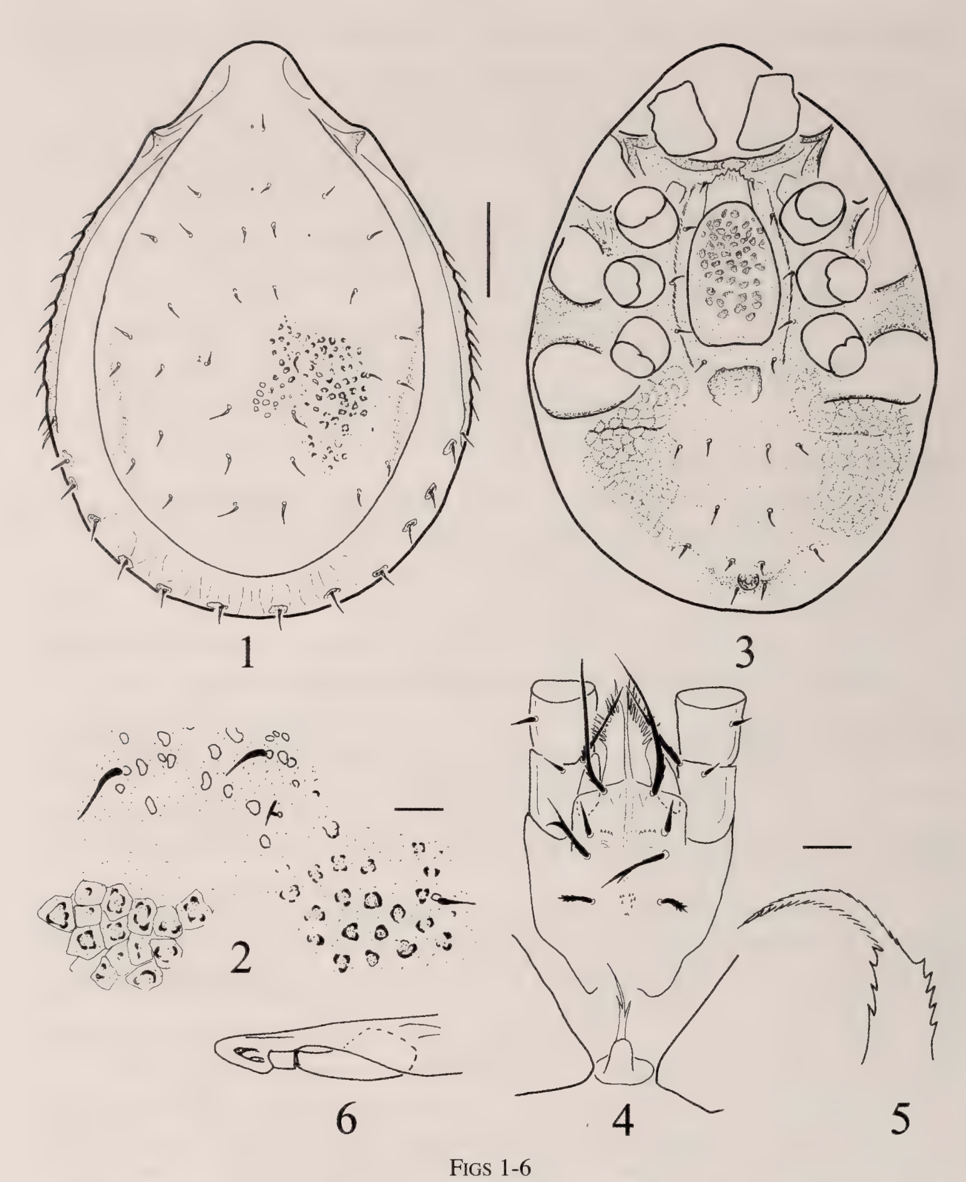
PARATYPES: MHNG, without registration number; two females in alcohol; HNHM, without registration number; one female with gold-palladium coating and stored on aluminium stub; all with same data as for holotype.

DIAGNOSIS: All dorsal, marginal and postdorsal setae needle-like. Postdorsal and marginal shields lacking, postdorsal setae are placed on small platelets. Genital shield of female linguliform, situated between coxae II and IV, with irregular pits on its surface and bearing a crown-like process on its anterior margin.

DESCRIPTION OF FEMALE: Length of idiosoma 610-620 μ m, width 430-440 μ m (n=4). Body shape oval, posterior margin rounded.

Dorsal aspect of idiosoma (Fig. 1): All dorsal setae short, smooth and needle-like. Dorsal shield with irregular pits (Fig. 2), marginal shield lacking. Margins of idiosoma bearing needle-like setae. Postdorsal shield lacking, postdorsal setae similar to dorsal setae and placed on small and rounded platelets.

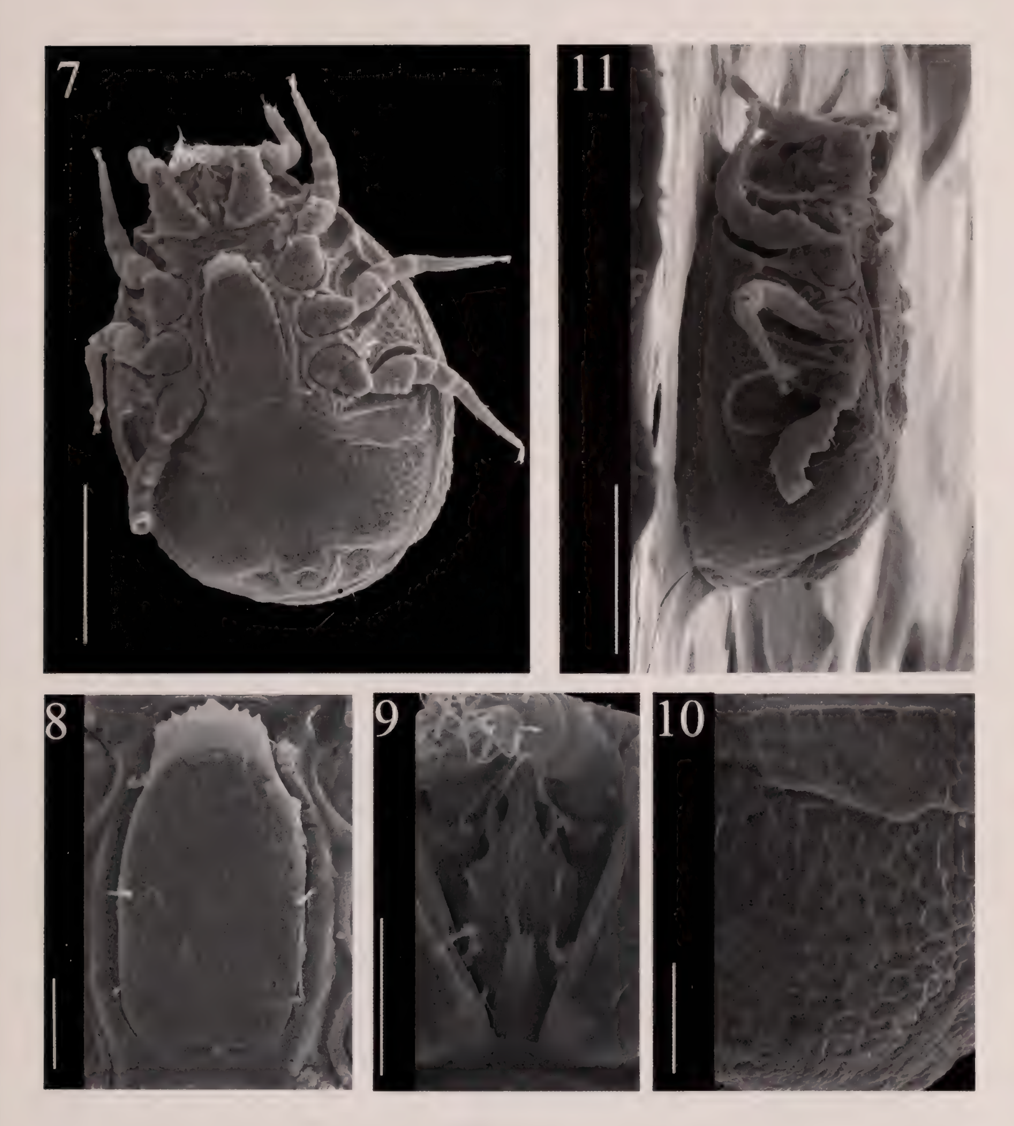
Ventral aspect of idiosoma (Figs 3, 7): Ornamentation of sternal shield lacking, all sternal setae short, smooth and needle-like. Ventral shield bearing an irregularly formed depression near basal part of genital shield. All ventral setae short, smooth and needle-like. Metapodal lines well developed, surface near metapodal lines (Fig. 10) and between metapodal lines covered by large irregular pits (Fig. 11), central part of ventral shield without sculptural pattern. Stigmata situated near coxae III. Peritremes straight. Genital shield of female linguliform, placed between coxae II and IV, with small irregular pits and with crown-like process on its anterior margin (Fig. 8).



FIGS 1-6

Discourella helvetica n. sp., female holotype. (1) Body in dorsal view. (2) Ornamentation of dorsal shield. (3) Body in ventral view. (4) Ventral view of gnathosoma. (5) Epistome. (6) Chelicera. Scale bars: 100 μm (1, 3), 20 μm (2, 4-6).

Gnathosoma (Figs 4, 9): Corniculi horn-like, internal malae long and apically serrate. Hypostomal setae: h1 long, smooth, setiform bearing spines basally; h2 0.25% of h1, smooth and setiform; h3 two times longer than h2 and apically bifurcated; h4 as long as h2, their margins serrate. Epistome basally serrate and apically pilose (Fig. 5). Tritosternum with narrow basis, apically subdivided into three visible branches. Chelicerae without nodes, fixed digit longer than movable digit (Fig. 6).



FIGS 7-11

Scanning micrographs of *Discourella helvetica* n. sp., female paratype. (7) Body in ventral view. (8) Genital region. (9) Ventral view of gnathosoma. (10) Ornamentation on lateral side of body. (11) Body in lateral view. Scale bars: 100 μm (7, 11), 20 μm (8-10).

Legs. Coxae of legs ornamented with alveolar pits, surface of other leg segments smooth. All legs bearing ambulacral claws and smooth and needle-like setae.

Male, nymphs and larva unknown.

ETYMOLOGY: The species name, an adjective, refers to the Latin name of Switzerland (Helvetia).

REMARKS: The new species belongs to the *stammeri*-species group (see Hirschmann 1972). Four known species were previously placed in this group; their

common character is the absence of the marginal shield. Only one of these species is known from Europe (*D. stammeri* Hirschmann & Zirngiebl-Nicol, 1969), one species was described from Japan (*D. fumiakii* Hiramatsu, 1980), another one was found in Mongolia (*D. kaszabi* Hirschmann, 1972), and the occurrence of the fourth species (*D. eustructura* Hirschmann, 1972) is unknown. The most important differences between these four species and the new species are summarized in Table 1.

TABLE 1. Distinguishing characters of the species in the *Discourella stammeri* species group

	D. helvetica	*D. stammeri*	*D. kaszabi*	*D. eustructura*	*D. fumiakii*
Depression near basal part of genital shield	present	absent	absent	absent	present
Ornamentation of dorsal shield	pits with irregular shape	pits with alveolar shape	reticulate surface	reticulate surface	pits with irregular shape
Dorsal and marginal setae	smooth and needle-like	smooth and needle-like	apically pilose	smooth and needle-like	apically pilose

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Revision of the Neotropical types of *Megarthrus* Curtis, 1829 and description of two new species from Costa Rica and Peru (Coleoptera, Staphylinidae, Proteininae)

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Revision of the Neotropical types of *Megarthrus* Curtis, 1829 and description of two new species from Costa Rica and Peru (Coleoptera, Staphylinidae, Proteininae). - The nine *Megarthrus* taxa hitherto described from the Neotropics are revised, and two new species are described from Costa Rica (*M. bierigi* **sp. n.**) and Peru (*M. machu* **sp. n.**). *Megarthrus solitarius adelphus* Bierig is raised to species level (*M. adelphus* Bierig **stat. nov.**). Lectotypes are designated for *M. inaequalis* Bierig, *M. mammiger* Bierig, *M. mastiger* Bierig, *M. solitarius* Sharp, *M. solitarius adelphus* Bierig and *M. zunilensis* Sharp. These eleven species are described, and their diagnostic characters are figured. The diversity of the genus in the Neotropics is briefly discussed.

Keywords: Taxonomy - Mexico - Central America – South America - diversity.

INTRODUCTION

The subfamily Proteininae is a group of rove-beetles with a predilection for cool and moderate climates. It is distributed worldwide, with the notable exception of Madagascar, it currently contains 5 subtribes, 11 genera and 196 species. Four of these tribes (8 genera and 9 species) occur only in New Zealand, Australia, New Caledonia and southern Chile, while the fifth and most derived one (Proteinini) is distributed predominantly in the northern hemisphere. *Megarthrus* Curtis, 1829, with some 139 species described, is by far the most diverse genus of the subfamily. It is also the only genus of Proteinini occuring south of the equator, where it is usually confined to montane habitats.

The presence of *Megarthrus* in the Neotropics was for the first time reported by Sharp (1887), who described *M. solitarius* and *M. zunilensis*, from Guatemala. Bernhauer (1929) described *M. altivagans*, from Mexico. Later Bruch (1940) described the Argentinian *M. ogloblini*, and Bierig (1940) added five new taxa from Central America (i.e. *M. flavosignatus*, *M. inaequalis*, *M. mammiger*, *M. mastiger*, and *M. solitarius* var. *adelphus*). Except for a brief comment on the amazingly close phylo - genetic relationships between *M. inaequalis* and the *M. auricola*-group from New Guinea (Cuccodoro, 1998), nothing has been published on the topic since. Their main

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diagnostic features (i.e. genitalia and male secondary characters) have never been illustrated.

I have examined the primary types described from this region, and the species they represent are redescribed below. In addition, two new species are described: one collected by Bierig is from Costa Rica, and the second, from Peru, is the largest *Megarthrus* currently known. These species are illustrated, and their presumed affinities are briefly discussed. They represent however not even the quarter of the species of Neotropical *Megarthrus* I recognized in the collections examined (see section Discussion). The remaining new species and identification keys will be dealt with in separate papers.

MATERIAL AND METHODS

For detailed examination, specimens were dissected, cleared in 0.1 N potassium hydroxide and mounted in Canada balsam on acetate slides. Drawings were made using a drawing tube mounted on a compound microscope.

The term frons, as used in the present study, refers to the area anterior to the U-shaped impression, the vertex to the area behind. Abdominal sternites and tergites are counted from the first morphological segment.

I have examined over 800 Neotropical *Megarthrus*. Only 67 specimens could be assigned to one of the nine species previously described. The label data of the types are reproduced verbatim between " ", with additional information pertaining to labels, or locality in [ ]. A slash / separates different labels. New data are given in standard format, with major administrative units in English and names of collectors in ( ).

The material studied is deposited in the following collections: BMNH = Natural History Museum, London; CNCI = Canadian National Collection of Insects, Ottawa; FMNH = Field Museum of Natural History, Chicago; MHNG = Muséum d'histoire naturelle, Geneva; MLPA = Museo de La Plata, La Plata; SEMC = Snow Entomological Museum, Lawrence.

TAXONOMY

The species treated below all have the eyes srongly convex to hemispherical with the upper margin sinuate in dorsal view, the occiptal ridge indistinct, the antennae with the scape not compressed and without patches of sensillae on the flabellum, the third maxillary palpomeres subcylindrical, the protrochanters without transverse ridge, the metasternum with postmesocoxal ridge arcuate in the middle, and the elytral apical margin slightly arcuate or straight near suture, the latter weakly arcuate toward obtuse apical angle. In order to keep the text more concise, these features are not repeated in the desriptions below.

Megarthrus adelphus Bierig **stat. nov.** Figs 10, 12-20

Megarthrus solitarius adelphus Bierig, 1940: 377.

TYPE MATERIAL: Lectotype (♀, in FMNH): "Carpintera, 6.viii.39. Costa Rica [hand - written] / Typus". – Paralectotypes (2 ♀♀): same data as lectotype, but "Paratypus", in FMNH, and MHNG by **present designation**.

DESCRIPTION: Habitus as in Fig. 10. Combined length of pronotum and elytra = 1.3-1.4 mm; maximal pronotal width = 0.9-1.1 mm. Body dark brown with appendages slightly paler; antennomeres 11 paler than antennomeres 1-10. Dorsal pubescence fairly uniform, denser on head and pronotum than on elytral disc; frontal setae directed forward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence fairly uniform, as long as or longer than that of prosternum; pubescence on abdominal tergites parallel, uniform; that on sternites IV-VII uniform. Frons, pronotum, elytra and anterior portion of prohypomera granulate; frontal granulation conspicuous, with granula about as high as their diameter, or higher; metasternum with granulofossulation becoming denser and finer posteriomedially.

Frons forming above clypeus a sharp ridge, the latter finely carinate, evenly arcuate in dorsal view; mesal portion of disc strongly evenly convex in lateral view; U-shaped frontal impression deep in middle, shallow laterally. Temples strongly convex in dorsal view. Antennae (Fig. 12) 2.3-2.5 times as long as pronotum.

Pronotum (Fig. 19) with center strongly convex in frontal view; disc deeply depressed near middle of lateral edges, shallowly depressed along anterior margin, posterior margin and posterior portion of medial groove; the latter slightly arcuate in lateral view, deep, parallel-sided; hypomera ridged from anterior margin to laterobasal angle, with a discal pit. Prosternal medial ridge absent. Scutellum with anterior margin rounded, posterior margin slightly arcuate toward acutely angular apex.

Elytra gradually widened (Fig. 10); humeral callus low, moderately convex; disc with low swellings, moderately depressed posteriorly along lateral edge; the latter finely carinate, indistinctly denticulate, slightly arcuate in dorsal view.

Abdominal sternites II and III with medial processes as in Fig. 20, posterior portion of process of sternite III trifid.

Male: Unknown.

Female: Abdominal tergite VIII (Figs 16, 17) lacking medioapical projection. Sternite VIII as in Fig. 18. Genital segments as in Figs 13-15; gonocoxal plate bearing a mediodorsal ridge.

DISTRIBUTION AND NATURAL HISTORY: The species is known only from Costa Rica. According to the original description, the types were collected by A. Bierig at 1800 m from sifted leaf litter near a fallen tree in a forest (together with the holotype of *M. flavosignatus*).

COMMENTS: *Megarthrus adelphus*, *M. bierigi*, *M. inaequalis*, *M. machu* and *M. mastiger* share a laterobasally broadly notched pronotum. Among these species, *M. adelphus* is easily distinguished the lateral contour of its pronotum forming four denticles.

Megarthrus altivagans Bernhauer, 1929 Figs 1, 21-38

Megarthrus altivagans Bernhauer, 1929: 187.

TYPE MATERIAL: Holotype (♀, in FMNH): "Mex. Desierto de los Leones, 20.vii.24, Dampf [handwritten] [handwritten underneath the card: esiero Leones 23. Dampf] / wald. 3-4000m, in rotgelbem Blätterpilz. [handwritten] / un. F. 247 Desierto 20/vii.24, rotgelbem Blätterpilz [handwritten] / *Megarthrus altivagans* Brnh. Typus unic [handwritten]".

ADDITIONAL MATERIAL: MEXICO, Jalisco, E slope of Nevado de Colima, 19mi W Alenquique <103°36'W; 19°32'N> ca. 3000m, 20-21.ix.1973 (Newton) 547Cs, #73-1125, ex

squid carrion trap in *Alnus* woodland, 1 ♂ in FMNH and 1 ♀ in MHNG; same data, but ca. 2400m, 21.ix.1973, berlese, ex mixed hardwood pine forest, 1 ♀ in FMNH; same data, but 21-22.ix.1973, on gilled mushrooms, 1 ♀ in FMNH. – Mexico, Volc. Popocatépetl, Km 10, ca. 3000m, 9.v.1971 (Campbell), 1 ♂ in CNCI.

DESCRIPTION: Habitus as in Fig. 1. Combined length of pronotum and elytra = 1.4-1.7 mm; maximal pronotal width = 0.9-1.1 mm. Body dark brown with appendages slightly paler. Dorsal pubescence uniform; medial frontal directed backward; elytral and pronotal pubescence slightly arcuate, recumbent; metasternal pubescence becoming sparser posteriomedially and longer anteriorly, shorter than prosternal pubescence; pubescence on abdominal tergites parallel, uniform. Frons and anterior portion of prohypomera granulate; frontal granulation fine, with granula lower than half of their diameter. Pronotum, elytra and lateral portions of metasternum granulo-fossulate; posteriomedial portion of metasternum impunctate.

Frons forming above clypeus a sharp ridge, the latter not carinate; mesal portion of disc weakly evenly convex in lateral view; U-shaped frontal impression shallow. Temples nearly flat in dorsal view. Antennae (Fig. 30) 1.9-2.1 times longer than pronotum.

Pronotum (Fig. 37) with center moderately convex in frontal view; disc shallowly depressed along lateral edges; medial groove nearly straight in lateral view, shallow, parallel-sided; hypomera without discal ridge, nor pit. Prosternal medial ridge absent. Scutellum with anterior margin fairly right-angled in midlle and posterior margin slighly arcuate toward acutely angular apex.

Elytra gradually widened (Fig. 1); humeral callus oboslete; disc with very low swellings, nearly flat posteriorly along lateral edge; the latter finely carinate, finely denticulate, nearly straight in dorsal view.

Abdominal sternites II and III with medial processes as in Fig. 38, posterior portion of process of sternite III straight.

Male: Anterior frontal edge raised in middle, horn-like. Protarsomeres 1 bearing tenent setae. Metafemora about as long as mesofemora (Fig. 29). Metatibiae (Fig. 23) longer than mesotibiae (Fig. 24). Metatarsomeres 1 shorter than combined length of metatarsomeres 2-4. Peg-like setae arranged in a double row on mesotrochanters (Fig. 29) and mesotibiae, in a single row on metatibiae, and absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters and metafemora. Pubescence on sternites IV-VII becoming denser posteriomedially. Apex of abdominal tergite VIII as in Figs 27-28. Sternite VIII as in Fig. 26. Hemitergites IX as in Fig. 25. Sternite IX lacking subbasal protuberance. Aedeagus as in Figs 21-22.

Female: Anterior frontal edge evenly arcuate in dorsal view. Abdominal tergite VIII (Figs 35-36) lacking medioapical projection. Pubescence on sternites IV-VII uniform, except for a pair of subapical macrosetae on each sternite. Sternite VIII as in Fig. 34. Genital segments as in Figs 31-33; gonocoxal plate lacking mediodorsal ridge.

DISTRIBUTION AND NATURAL HISTORY: The species is from Mexico, where it occurs in the vicinity of Mexico city (Parque Nacional Desierto de Los Leones and Parque Nacional Ixtaccihualtl-Popocatépetl) and about 450 km west in the Parque Nacional Nevado de Colima. *Megarthrus altivagans* has been collected in mixed hardwood pine forests and *Alnus* woodlands at elevations ranging from 2400-4000 m by

sifting forest litter, in gilled mushrooms, and using squid carrion traps. Two large oval eggs (0.8 x 0.3 mm) were found in the abdomen of the holotype.

COMMENTS: *Megarthrus altivagans* is so far the only Neotropical *Megarthrus* having the frontal setae directed backward and bearing adhesive setae on the first protarsomeres in the male. Also, the medially raised, horn-like frontal margin in the male is distinctive. It strongly resembles *M. ashei* Cuccodoro & Löbl, 1996, from the Rocky Mountains of Arizona and New Mexico, which has a slightly different aedeagus and the frons unmodified in the male.

***Megarthrus bierigi* sp. n.** Figs 7, 39-56

TYPE MATERIAL: Holotype (♂, in SEMC): COSTA RICA, Puntarenas, Monteverde Biol. Res., trail near lab, 1550m, 21-22.v.1993 (Michalski) ex flight intercept trap. – Paratypes (13): same data as holotype, 2 ♀♀ in MHNG and SEMC; same data, but 26-28.v.1993, 2 ♀♀ in SEMC. – Same data, but 1-2.vi.1993, 2 ♂♂ in SEMC and 1 ♂ in MHNG. – Same data, but 1620m, 25.vi.1990 (Roberts) ex flight intercept trap, 1 ♀ in MHNG. – COSTA RICA, Alajuela, Peñas Blancas, 1420m, 20.v.1989 (Ashe, Leschen & Brooks) #274, ex flight intercept trap, 1 ♂ in SEMC. – San Isidro, La Estrella, 16.x.1941 (Bierig) 1 ♂ and 3 ♀♀ in FMNH [mislabelled types of *M. inaequalis* Bierig].

DESCRIPTION: Habitus as in Fig. 7. Combined length of pronotum and elytra = 1.3-1.4 mm; maximal pronotal width = 0.9-1.1 mm. Body dark brown with appendages slightly paler; antennomeres 11 paler than antennomeres 1-10. Dorsal pubescence fairly uniform, denser on head and pronotum than on elytral disc; frontal setae directed forward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence fairly uniform, as long as or longer than that of prosternum; pubescence on abdominal tergites parallel, uniform; that on sternites IV-VII uniform. Frons, pronotum, elytra and anterior portion of prohypomera granulate; frontal granulation conspicuous, with granula about as high as their diameter, or higher; metasternum with granulofossulation becoming denser and finer posteriomedially.

Frons forming above clypeus a sharp ridge, the latter finely carinate, weakly arcuate in middle and laterally oblique in dorsal view; mesal portion of disc strongly evenly convex in lateral view; U-shaped frontal impression deep in middle, shallow laterally. Temples strongly convex in dorsal view. Antennae (Fig. 51) 2.3-2.5 times longer than pronotum.

Pronotum (Fig. 56) with center strongly convex in frontal view; disc deeply depressed near middle of lateral edges, shallowly depressed along anterior margin, posterior margin and posterior portion of medial groove; the latter slightly arcuate in lateral view, deep, parallel-sided; hypomera ridged from anterior margin to laterobasal angle, with a discal pit. Prosternal medial ridge absent. Scutellum with anterior margin rounded and posterior margin slighly arcuate toward acutely angular apex.

Elytra gradually widened (Fig. 7); humeral callus raised, forming a blunt longitudinal ridge; disc with low swellings, moderately depressed posteriorly along lateral edges; the latter finely carinate, indistinctly denticulate, slightly arcuate in dorsal view.

Abdominal sternites 2 and 3 with medial processes as in Fig. 54, posterior portion of process of sternite 3 widened.

Male: Frontoclypeal area not modified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 43) as long as metafemora (Fig. 45). Mesotibiae (Fig. 42) shorter

than metatibiae (Fig. 43). Metatarsomeres 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae arranged in a single row on mesotrochanters (Fig. 43), grouped in a field on mesotibiae and metatibiae, and absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters and metafemora. Apex of abdominal tergite VIII as in Figs 44, 47. Sternite VIII as in Fig. 46. Sternite IX lacking subbasal protuberance. Aedeagus as in Figs 39, 40.

Female: Abdominal tergite 8 (Figs 53, 55) lacking a medioapical projection. Sternite VIII as in Fig. 52. Genital segments as in Figs 48-50; gonocoxal plate bearing a mediodorsal ridge.

ETYMOLOGY: The species is named after its first collector, Alejander A. Bierig, San Pedro de Montes de Oca.

DISTRIBUTION AND NATURAL HISTORY: The species is apparently restricted to Costa Rica, where it was collected at elevations ranging from 1400-1600 m using flight intercept traps.

COMMENTS: From the Neotropical *Megarthrus* possessing a conspicuous humeral callus (*M. bierigi*, *M. inaequalis* and *M. mammiger*), *M. bierigi* can be easily distinguished by its lack of elytral discal humps. See comments under *M. adelphus*.

Megarthrus flavosignatus Bierig, 1940 Figs 5, 57-68

Megarthrus flavosignatus Bierig, 1940: 378.

TYPE MATERIAL: Holotype (♂, in FMNH): "Carpintera, 6.viii.39, Costa Rica [handwritten] | Typus".

ADDITIONAL MATERIAL: Same data as holotype, but 16.vi.1940, 1 ♂ in MHNG.

DESCRIPTION: Habitus as in Fig. 5. Combined length of pronotum and elytra = 1.3-1.4 mm; maximal pronotal width = 0.9-1.1 mm. Body dark brown wih appendages slightly paler; antennomeres 10-11 paler than antennomeres 1-9. Dorsal pubescence denser on head and pronotum than on elytral disc, becoming denser along medial groove of pronotum and on anterior portion of elytral disc; frontal setae directed forward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence becoming denser anteriorly and medially, as long as or longer than that of prosternum; pubescence on abdominal tergites parallel, uniform; that on sternites IV-VIII uniform. Frons, pronotum, lateral portion of elytral disc and anterior portion of prohypomera granulate; frontal granulation conspicuous, with granula about as high as their diameter, or higher; central, adsutural and posterior area of elytral disc punctate, coarsely; metasternum coarsely granulofossulate.

Frons forming above clypeus a sharp ridge, the latter finely evenly carinate, nearly straight in middle and laterally oblique in dorsal view; mesal portion of disc strongly evenly convex in lateral view; U-shaped frontal impression shallow. Temples strongly convex in dorsal view. Antennae (Fig. 61) 2.1-2.3 times longer than pronotum.

Pronotum (Fig. 68) with center strongly convex in frontal view; disc deeply depressed near middle of lateral edges, shallowly depressed along anterior and posterior margins; medial groove slightly arcuate in lateral view, deep, narrowed in middle; hypomera ridged from anterior margin to laterobasal angle, disc without pit. Prosternal medial ridge absent, or absent. Scutellum with anterior margin rounded and posterior margin slighly arcuate toward right-angled apex.

Elytra gradually widened (Fig. 5); humeral callus low, moderately convex; disc with low swellings, moderately depressed posteriorly along lateral edges; the latter very finely carinate, finely denticulate, slightly sinuate in dorsal view.

Abdominal sternites II and III with medial processes as in Fig. 66, posterior portion of process of sternite III straight.

Male: Frontoclypeal area not modified. Protarsomeres 1 lacking tenent setae. Mesofemorar (Fig. 62) as long as metafemora. Mesotibiae (Fig. 60) shorter than metatibia (Fig. 59). Metatarsomere 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae arranged in a single row on mesotrochanters (Fig. 62) and mesotibiae, arranged in double row on metatibiae, and absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters and metafemora. Apex of abdominal tergite VIII as in Figs 63, 67. Sternite 8 as in Figs 64-65. Sternite IX lacking subbasal protuberance. Aedeagus as in Figs 57-58.

Female: Unknown.

DISTRIBUTION AND NATURAL HISTORY: The species is known only from the type locality in Costa Rica. According to the original description, A. Bierig collected the holotype at 1800 m from sifted leaf litter of a fallen tree in forest (together with the types of *M. adelphus*).

COMMENTS: The male abdominal sternite VIII with a pair of projecting tips of *M. flavosignatus* is particularly notable. This feature is shared only with *M. zunilensis*, which has different male sexual characters. See comments under *M. zunilensis*.

Megarthrus inaequalis Bierig, 1940 Figs 8, 69-86

Megarthrus inaequalis Bierig, 1940: 379.

TYPE MATERIAL: Lectotype (♂, in FMNH): "Vara Blanca, viii.38, Costa Rica [handwritten] / Typus". – Paralectotypes (2): same data as lectotype, but "Paratypus", 1 ♂ in MHNG and 1 ♀ in FMNH, **by present designation**.

ADDITIONAL MATERIAL: COSTA RICA, Puntarenas, Monteverde Biol. Res., trail near lab, 1550m, 21-22.v.1993 (Michalski) ex flight intercept trap, 1 ♂ and 1 ♀ in SEMC; same data, but 25.v.1993, 2 ♀♀ in MHNG and SEMC; same data, but 26-28.v.1993, 2 ♀♀ in MHNG and SEMC; same data, but 30.v.1993, 1 ♀ in SEMC; same data, but near Quebrada cuecha, on Sendero Rio, 1580m, 13.v.1989 (Ashe, Leschen & Brooks) #163, ex *Xylaria*, 1 ♀ in SEMC; same data, but 1500m, 1-4.vi.1979 (Campbell) 1 ♂ in CNCI.

DESCRIPTION. Habitus as in Fig. 8. Combined length of pronotum and elytra = 1.3-1.5 mm; maximal pronotal width = 0.9-1.0 mm. Body dark brown with appendages slightly paler; antennomeres 10-11 paler than antennomeres 1-9. Dorsal pubescence fairly uniform, denser on head and pronotum than on elytral disc; frontal setae directed forward; elytral and pronotal setae slightly arcuate, semi-erect; metasternal pubescence becoming denser posteriomedially, as long as or longer than that of prosternum; pubescence on abdominal tergites parallel, uniform; that on sternites 4-7 uniform. Frons, pronotum, elytra and anterior portion of prohypomera granulate; frontal granulation conspicuous, with granula about as high as their diameter, or higher; metasternum with granulofossulation becoming finer posteriomedially.

Frons forming above clypeus a sharp ridge, the latter finely evenly carinate, weakly arcuate in middle and laterally oblique in dorsal view; mesal portion of disc

slightly evenly convex in lateral view; U-shaped frontal impression in middle deep, shallow laterally. Temples strongly convex in dorsal view. Antennae (Fig. 78) 2.1-2.3 times longer than pronotum.

Pronotum (Fig. 85) with center strongly convex in frontal view; disc deeply depressed near middle of lateral edges, shallowly depressed along anterior and posterior margins; medial groove slightly arcuate in lateral view, deep, parallel-sided; hypomera ridged from anterior margin to laterobasal angle, with a discal pit. Prosternal medial ridge present anteriorly, fine. Scutellum with anterior margin rounded and posterior margin slighly arcuate toward acutely angular apex.

Elytra gradually widened (Fig. 8); humeral callus raised, forming a blunt longitudinal ridge; disc with low anterior adsutural hump and conspicuous posterior adsutural hump, shallowly depressed posteriorly along lateral edges; the latter very finely carinate, moderately denticulate, slightly arcuate in dorsal view.

Abdominal sternites II and III with medial processes as in Fig. 86, posterior portion of process of sternite III widened.

Male: Frontoclypeal area not modified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 77) as long as metafemora. Mesotibiae (Fig. 72) shorter than metatibiae (Fig. 71). Metatarsomeres 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae arranged in a single row on metatibia, grouped in a field on mesotrochanters (Fig. 77) and mesotibiae, and absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters and metafemora. Apex of abdominal tergite VIII as in Figs 73, 75, 76. Sternite VIII as in Fig. 74. Sternite IX lacking subbasal protuberance. Aedeagus as in Figs 69, 70.

Female: Abdominal tergite VIII (Figs 83-84) lacking medioapical projection. Sternite VIII as in Fig. 82. Genital segments as in Figs 79-81; gonocoxal plate bearing a mediodorsal ridge.

Distribution and natural history: The species is apparently restricted to Costa Rica, at elevations ranging between 1500-1800 m. According to the original description, A. Bierig collected the types in shrubs bordering a primary forest at an elevation of 1800 m between Volcanoes Barba and Poás. Additional specimens were collected in Xylaria (fungi) or using flight intercept traps.

Comments: *Megarthrus inaequalis* and *M. mammiger* are the only Neotropical members of the genus bearing conspicuous posterior adsutural humps. These two species can be easily distiguished by the shape of the pronotum, which is broadly notched laterobasally only in *M. inaequalis*. The diagnostic shape of the male abdominal tergite VIII of *M. inaequalis* is also particularly notable. See comments under *M. adelphus* and *M. bierigi*.

Megarthrus machu **sp. n.** Figs 11, 87-104

Type material: Holotype (♂, in SEMC): PERU, Cuzco Dept., Pillahuata, Manu Rd., Km 128, 27.ix.1982 (Watrous & Mazurek) #82-308, ex vine litter. – Paratypes (4): same data as holotype, 1 ♀ in FMNH; same data, but 26.ix.1982, #82-301, 2 ♀♀ in FMNH and MHNG; same data, but 25.ix.1982, #82-290, on tent, 1 ♀ in FMNH.

Description: Habitus as in Fig. 11. Combined length of pronotum and elytra = 2.1-2.3 mm; maximal pronotal width = 1.5-1.6 mm. Body dark brown with appendages

and elytra slightly paler; antennomeres 10-11 paler than antennomeres 1-9. Dorsal pubescence fairly uniform, denser on head and pronotum than on elytral disc; frontal setae directed forward; elytral and pronotal setae fairly straight, recumbent; metasternal pubescence fairly uniform, shorter than prosternal; pubescence on abdominal tergites parallel, becoming denser near posterior margin of tergite VII. Frons, humeral callus of elytra and anterior portion of prohypomera granulate; frontal granulation conspicuous, with granula about as high as their diameter, or higher; pronotum granulofossulate; metasternum with granulofossulation becoming denser and finer posteriomedially; elytral disc coarsely punctate.

Frons forming above clypeus a sharp ridge. the latter finely evenly carinate, weakly arcuate in middle and laterally oblique in dorsal view; mesal portion of disc strongly evenly convex lateral view; U-shaped frontal impression deep. Temples strongly convex in dorsal view. Antennae (Fig. 98) 2.3-2.6 times longer than pronotum.

Pronotum (Fig. 97) with center strongly convex in frontal view; disc deeply depressed near middle of lateral edge, shallowly depressed along anterior and posterior margins; medial groove slightly arcuate in lateral view, deep, parallel-sided; hypomera ridged from anterior margin to laterobasal angle, disc without pit. Prosternal medial ridge entire. Scutellum with anterior margin angulate in middle and posterior margin slighly arcuate toward obtusely angular apex.

Elytra abruptly widened subbasally (Fig. 11); humeral callus low, moderately convex; disc with low swellings, deeply depressed along lateral edge; the latter finely carinate, markedly denticulate, strongly arcuate in dorsal view.

Abdominal sternites II and III with medial processes as in Fig. 96, posterior portion of process of sternite III widened, or trifid.

Male: Frontoclypeal area not modified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 90) as long as metafemora (Fig. 89). Mesotibiae (Fig. 94) shorter than metatibiae (Fig. 95). Metatarsomeres 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae arranged in a single row on mesotrochanters (Fig. 90), grouped in a field on mesotibiae and metatibiae, and absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters (Fig. 89) and metafemora. Pubescence on sternites IV-VII becoming denser posteriomedially. Apex of abdominal tergite VIII as in Figs 91, 93. Sternite VIII as in Fig. 92. Sternite IX lacking subbasal protuberance. Aedeagus as in Figs 87-88.

Female: Pubescence on sternites IV-VII uniform, except for a pair of subapical macrosetae on each sternite. Abdominal tergite VIII (Figs 102-103) without medioapical projection. Sternite VIII as in Fig. 104. Genital segment as in Figs 99-101; gonocoxal plate bearing a mediodorsal ridge.

DISTRIBUTION AND NATURAL HISTORY: *Megarthrus machu* is know only from the type locality in Peru (Pillahuata <3° 7' S; 71° 25' W>), which is situated at an elevation of nearly 2500 m just below a patch of forest. It was found in vine leaf litter, and showed good ability to fly (one specimen was found on a tent).

COMMENTS: Within Neotropical *Megarthrus*, *M. machu* is easily distinguished by its abruptly and broadly expanded elytra. Exceeding 4 mm in length (when measured from the middle of the frontal margin to the tip of the abdomen), it is the largest species of Proteininae of the world. See comments under *M. adelphus*.

Megarthrus mammiger **Bierig, 1940** Figs 2, 105-123

Megarthrus mammiger Bierig, 1940: 375.

Type material: Lectotype (♂, in FMNH): "Vara Blanca, viii.38, Costa Rica [handwritten] / Typus". – Paralectotype (1 ♀, in FMNH): same data as lectotype, but "Paratypus", **by present designation**.

Additional material: COSTA RICA, Hwy #2, km 93 <83°45'W; 9°36'N> 3200m, iv.1985 (Goulet & Masner), 1 ♂ in CNCI. – Puntarenas, Monte Verde, Cerro Amigos, 1780m, 21.v.1989 (Ashe, Brooks & Leschen) flight intercept trap, #315, 1 ♂ and 1 ♀ in SEMC. – Volc. Irazú, 2800m, 18.i.1940 (Bierig), 1 ♂ in MHNG. – El Jardiú, ca. 3000m, 19.v.1944 (Bierig), 1 ♂ in FMNH. – San Isidro de il Tajar, ca. 1500m, 19.v.1944 (Bierig), 1 ♀ in MHNG.

Description: Habitus as in Fig. 2. Combined length of pronotum and elytra = 1.8-1.9 mm; maximal pronotal width = 1.3 mm. Body dark brown with appendages and elytra slightly paler; antennomeres 10-11 paler than antennomeres 1-9. Dorsal pubescence fairly uniform, denser on head and pronotum than on elytral disc; frontal setae directed forward; elytral and pronotal setae fairly straight, recumbent; metasternal pubescence fairly uniform, shorter than prosternal; pubescence on abdominal tergites parallel, uniform. Frons, anterior portion of prohypomera, humeral callus and lateral area of elytral disc granulate; frontal granulation inconspicuous, with granula about as high as half of their diameter; pronotum granulofossulate; metasternum with granulofossulation becoming finer posteriomedially; adsutural half of elytral disc punctate.

Frons forming above clypeus a sharp ridge, the latter finely evenly carinate, weakly arcuate in middle and laterally oblique in dorsal view; mesal portion of disc strongly evenly convex in lateral view; U-shaped frontal impression deep in middle, shallow laterally. Temples strongly convex in dorsal view. Antennae (Fig. 115) 2.3-2.6 times longer than pronotum.

Pronotum (Fig. 123) with center strongly convex in frontal view; disc deeply depressed near middle of lateral edges, shallowly depressed along anterior and posterior margins; medial groove nearly straight in lateral view, deep, somewhat narrowed in middle; hypomera ridged from anterior margin to laterobasal angle, disc without pit. Prosternal medial ridge absent. Scutellum with anterior margin angulate in middle and posterior margin slighly arcuate toward right-angled apex.

Elytra gradually widened (Fig. 2); humeral callus raised, forming a blunt longitudinal ridge; disc with low anterior and posterior adsutural humps, moderately depressed posteriorly along lateral edge; the latter finely carinate, finely denticulate, nearly straight in dorsal view.

Abdominal sternites II and III with medial processes as in Fig. 120, posterior portion of process of sternite III trifid.

Male: Frontoclypeal area not modified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 111) as long as metafemora (Fig. 110). Mesotibiae (Fig. 107) shorter than metatibiae (Fig. 108). Metatarsomeres 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae arranged in a single row on mesotrochanters (Fig. 111), mesotibiae and metatibiae, absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters metatrochanter (Figs 109-110) and metafemora; metatrochanters with a projecting process. Pubescence on sternites IV-VII becoming denser posteriomedially. Apex of abdominal tergite VIII as in Figs 113, 114. Sternite VIII as in Fig. 112. Sternite IX lacking subbasal protuberance. Aedeagus as in Figs 105-106.

Female: Pubescence on sternites IV-VII uniform, except for a pair of subapical macrosetae on each sternite. Abdominal tergite VIII (Figs 121-122) without medio-apical projection. Sternite VIII as in Fig. 119. Genital segments as in Figs 116-118; gonocoxal plate bearing a mediodorsal ridge.

DISTRIBUTION AND NATURAL HISTORY: The species is known only from Costa Rica, where it was found at elevations ranging from 1500-3200 m. According to the original description, A. Bierig collected the types between the Volcanoes Barba and Poás, at 1800 m in cow dung and in dead bamboo leaves.

COMMENTS: Among the Neotropical *Megarthrus* possessing a conspicuous humeral callus (see comments under *M. bierigi*), *M. mammiger* can be easily recognised by its laterobasally shallowly emarginated pronotum. See also comments under *M. inaequalis* and *M. mastiger*.

Megarthrus mastiger Bierig, 1940 Figs 9, 124-142

Megarthrus mastiger Bierig, 1940: 376.

TYPE MATERIAL: Lectotype (♂, in FMNH): "Vara Blanca, viii.38, Costa Rica [handwritten]". Paralectotypes (4): Same data as lectotype, 2 ♂♂ and 2 ♀♀ in FMNH and MHNG, **by present designation**.

ADDITIONAL MATERIAL: COSTA RICA, Puntarenas, Monte Verde, 1520m, 14.v.1989 (Ashe, Brooks & Leschen) flight intercept traps, #177, 1 ♀ in SEMC.

DESCRIPTION: Habitus as in Fig. 9. Combined length of pronotum and elytra = 1.5-1.7 mm; maximal pronotal width = 1.0-1.1 mm. Body dark brown with appendages slightly paler; antennomeres 10-11 paler than antennomeres 1-9. Dorsal pubescence uniform; frontal setae directed forward; elytral and pronotal setae fairly straight, recumbent; metasternal pubescence uniform, shorter than prosternal; pubescence on abdominal tergites parallel, uniform; that on sternites IV-VII uniform, except for a pair of subapical macrosetae setae on each sternite. Frons, pronotum, elytra and anterior portion of prohypomera granulate; frontal granulation inconspicuous, with granula about as high as half of their diameter, or higher; pronotum granulofossulate; meta-sternum with granulofossulation becoming finer posteriomedially.

Frons forming above clypeus a sharp ridge, the latter finely evenly carinate, evenly arcuate in dorsal view; mesal portion of disc strongly evenly convex in lateral view; U-shaped frontal impression deep in middle, shallow laterally. Temples strongly convex in dorsal view. Antennae (Fig. 137) 2.2-2.4 times longer than pronotum.

Pronotum (Fig. 141) with center moderately convex in frontal view; disc deeply depressed near middle of lateral edges, shallowly depressed along anterior margin, posterior margin and posterior portion of medial groove; the latter nearly straight in lateral view, deep, parallel-sided; hypomera ridged from anterior margin to laterobasal angle, with a discal pit. Prosternal medial ridge absent. Scutellum with anterior margin subangulate in middle and posterior margin strongly arcuate toward obtusely angled apex.

Elytra gradually widened (Fig. 9); humeral callus low, moderately convex; disc with low adscutellar hump, shallowly depressed posteriorly along lateral edge; the latter finely carinate, finely denticulate, somewhat sinuate in dorsal view.

Abdominal sternites II and III with medial processes as in Fig. 142, posterior portion of process of sternite III straight.

Male: Frontoclypeal area not modified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 128) shorter than metafemora (Fig. 130). Mesotibiae (Fig. 127) shorter than metatibiae (Fig. 126). Metatarsomeres 1 somewhat shorter than combined length of metatarsomeres 2-4. Peg-like setae arranged in a single row on mesotrochanters (Fig. 128), grouped in a field on mesotibiae and metatibiae, and absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters (Figs 130, 133) and metafemora. Apex of abdominal tergite VIII as in Figs 129, 131. Sternite VIII as in Fig. 132. Sternite IX lacking subbasal protuberance. Aedeagus as in Figs 124-125.

Female: Abdominal tergite VIII (Figs 139-140) lacking a medioapical projection. Sternite VIII as in Fig. 138. Genital segments as in Figs 134-136; gonocoxal plate lacking a mediodorsal ridge.

Distribution and natural history: The species is known only from Costa Rica, where it was found at elevations ranging between 1500 and 1800 m. According to the original description, A. Bierig collected the types between the Volcanoes Barba and Poás, at 1800 m in cow dung and decaying leaves of shrubs at forest margins.

Comments: The species differs from all the other Neotropical *Megarthrus* by the particularly narrow mediobasal projection af the abdominal sternite VIII. The presence of a small projecting process on the metatrochanter in the male is only shared with *M. mammiger*, which differs notably from *M. mastiger* by the lateral contour of the pronotum, and by the presence on the female of a mediodorsal ridge on the gonocoxal plate. See comments under *M. adelphus*.

Megarthrus ogloblini Bruch, 1940 Figs 4, 143-153

Megarthrus ogloblini Bruch, 1940: 113.

Type material: Holotype (♂, in MLPA): "Loreto, Misiones, Rep. Argentina, Dr. A.A. Ogloblin [typewritten], 15.v.1934 [handwritten underneath the label] / *Megarthrus ogloblini* Bruch [handwritten], C. Bruch determ. 1939 [typewritten] / Museo La Plata [typewritten] / Typus ! [handwritten]".

Description: Habitus as in Fig. 4. Combined length of pronotum and elytra = 1.5 mm; maximal pronotal width = 1.0 mm. Body dark brown wih appendages somewhat paler; antennomeres 10-11 slightly paler than antennomeres 1-9. Dorsal pubescence fairly uniform, denser near lateral margin of elytra and somewhat longer anteriomedially on pronotum; frontal setae directed forward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence uniform, as long as or longer than that of prosternum; pubescence on abdominal tergites parallel; that on sternites IV-VII uniform. Frons, pronotum, elytra and anterior portion of prohypomera granulate; frontal granulation conspicuous, with granula about as high as their diameter, or higher; metasternum with granulofossulation becoming denser and finer posteriomedially.

Frons forming above clypeus a sharp ridge finely evenly carinate, the latter evenly arcuate in dorsal view; mesal portion of disc weakly evenly convex in lateral view; U-shaped frontal impression deep in middle, shallow laterally. Temples strongly convex in dorsal view. Antennae (Fig. 145) 2.4 times longer than pronotum.

Pronotum (Fig. 147) with center strongly convex in frontal view; disc deeply depressed near middle of lateral edges, shallowly depressed along posterior margin and posterior portion of medial groove; the latter slightly arcuate in lateral view, deep, parallel-sided; hypomera ridged from anterior margin to laterobasal angle, disc without pit. Prosternal medial ridge entire. Scutellum with anterior margin subangulate in middle and posterior margin broadly arcuate toward right-angled apex.

Elytron gradually widened (Fig. 4); humeral callus low, moderately convex; disc with low swellings, shallowly depressed posteriorly along lateral edge, the latter finely carinate, indistinctly denticulate, slightly arcuate in dorsal view.

Abdomal sternites II and III with medial processes similar to that in Fig. 20, posterior portion of process of sternite III widened.

Male: Frontoclypeal area not modified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 152) shorter than metafemora (Fig. 153). Mesotibiae (Fig. 148) shorter than metatibiae (Fig. 149). Metatarsomeres 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae arranged in two rows on mesotrochanters (Fig. 152), grouped in a field on mesotibiae and metatibiae, and absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters and metafemora. Apex of abdominal tergite VIII as in Figs 150-151. Sternite VIII as in Fig. 146. Sternite IX lacking a subbasal protuberance. Aedeagus as in Figs 143-144.

Female: Unknown.

DISTRIBUTION AND NATURAL HISTORY: *Megarthrus ogloblini* is known only from the type locality in Argentina (Loreto <27° 18' S; 55° 32 W>), which lies at an elevation of nearly 200 m, near the Rio Paraná. *Megarthrus ogloblini* is the only Neotropical member of the genus collected below 1400 m. It is also the southernmost record of a species of Proteinini in the New World.

COMMENTS: *Megarthrus ogloblini* differs from the other Neotropical *Megarthrus*, except for *M. solitarius*, by the shape of the pronotum, which is shallowly emarginate laterobasally and has the lateral contours forming four denticles. It can be easily distinguished from *M. solitarius* by the sexual characters.

Megarthrus solitarius Sharp, 1887 — Figs 3, 154-170

Megarthrus solitarius Sharp, 1887: 743.

TYPE MATERIAL: Holotype (♀, in BMNH): "*Megarthrus solitarius*. Type D. S. Purula, Guatemala, Champion [Sharp's handwritting] / Purula, Vera Paz, Champion / B.C.A. Col. 1. 2. *Megarthrus solitarius* Sharp".

ADDITIONAL MATERIAL: GUATEMALA, Bja Verapaz, 8km S Purulhá, 1650m 29.vi.1993 (Ashe & Brooks) #149, ex *Cecropia* treefall, 2 ♂♂ and 2 ♀♀ in MHNG and SEMC.

DESCRIPTION: Habitus as in Fig. 3. Combined length of pronotum and elytra = 1.3-1.5 mm; maximal pronotal width = 0.9-1.1 mm. Body dark brown wih appendages slightly paler; antennomeres 10-11 paler than antennomeres 1-9. Dorsal pubescence fairly uniform, denser on pronotum than on elytra; frontal setae directed forward; elytral and pronotal setae slightly arcuate, recumbent; metasternal setae uniform, shorter than prosternal; pubescence on abdominal tergites parallel; that on sternites IV-VII uniform, except for a pair of subapical macrosetae on each sternite.

Frons, pronotum, elytra and anterior portion of prohypomera granulate; frontal granulation conspicuous, with granula about as high as their diameter, or higher; metasternum with granulofossulation becoming denser and finer posteriomedially.

Frons forming above clypeus a sharp ridge, the latter finely evenly carinate, evenly arcuate in dorsal view; mesal portion of disc weakly evenly convex in lateral view; U-shaped frontal impression deep in middle, shallow laterally. Temples strongly convex in dorsal view. Antennae (Fig. 165) 2.1-2.3 times longer than pronotum.

Pronotum (Fig. 169) with center moderately convex in frontal view; pronotal disc deeply depressed near middle of lateral edges, shallowly depressed along anterior margin, posterior margins and posterior portion of medial groove; the latter slightly arcuate in lateral view, deep, parallel-sided; hypomera ridged from anterior margin to laterobasal angle, disc without pit. Prosternal medial ridge absent. Scutellum with anterior margin subangulate in middle and posterior margin weakly arcuate toward right-angled apex.

Elytra gradually widened (Fig. 3); humeral callus low, moderately convex; disc with low swellings, moderately depressed posteriorly along lateral edge, the latter finely carinate, very finely denticulate, in dorsal view slightly arcuate.

Abdominal sternites II and III with medial processes as in Fig. 170, posterior portion of process of sternite III widened, or trifid.

Male: Frontoclypeal area not modified. Protarsomeres 1 lacking tenent setae. Mesofemora (Fig. 158) as long as metafemora. Mesotibiae (Fig. 159) shorter than metatibiae. Metatarsomeres 1 about as long as combined length of metatarsomeres 2-4. Peg-like setae arranged in a single row on mesotrochanters (Fig. 158), grouped in a field on mesotibiae, and absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters, metafemora and metatibiae. Apex of abdominal tergite VIII as in Figs 156, 157. Sternite VIII as in Figs 160-161. Sternite IX lacking subbasal protuberance. Aedeagus as in Figs 154, 155.

Female: Abdominal tergite VIII (Figs 166-167) with a medioapical projection. Sternite VIII as in Fig. 168. Genital segments as in Figs 162-164; gonocoxal plate bearing a mediodorsal ridge.

DISTRIBUTION AND NATURAL HISTORY: *Megarthrus solitarius* is apparently endemic to Guatemala (Dept de Baja Verapaz), where it was collected in *Cecropia treefall* at an elevation of 1650 m.

COMMENTS: *Megarthrus solitarius* and *M. zunilensis* are apparently the only Neotropical *Megarthrus* with the abdominal tergite VIII forming a medioapical projection in the female. These two species differ, however, in most of the other sexual characters. See discussion under *M. ogloblini*.

Megarthrus zunilensis Sharp, 1887 Figs 6, 171-187

Megarthrus zunilensis Sharp, 1887: 743.

TYPE MATERIAL: Lectotype (♂, in BMNH): "*Megarthrus zunilensis*. Type D. S., Cerro Zunil. Guatem., Champion [Sharp's handwritting] | Cerro Zunil, Guatemala, Champion | B.C.A. Col. 1. 2. Megarthrus zunilensis Sharp". – Paralectotypes (2 ♀♀ in BMNH): same data as lectotype, but "Sp. figured"; same data as lectotype, but "Cerro Zunil, 4-5000 ft., Champion", **by present designation**.

Additional material: COSTA RICA, Puntarenas, Monteverde Biol. Res., ca. 1500m, 23-24.v.1979 (Campbell) 1 ♂ in CNCI. – GUATEMALA, Quetzaltenango, 14.2km SW Zunil, 1340m, 20.vi.1993 (Génier) ex human faeces trap, 1 ♀ in SEMC. – Sacatepequez, 4.5km SW san Miguel, Duenas, 1760m, 12.vi.1991 (Anderson) #91-61, ex mesic hardwood litter, 1 ♂ in SEMC. – Zacapa, 3.5km SE La Union, 1500m, 4.vi.1991 (Anderson) #91-50, ex cloud forest litter, 1 ♀ in SEMC; same data, but 23-25.vi.1993 (Brooks & Ashe) #103, ex flight intercept trap, 1 ♀ in MHNG. – HONDURAS, Santa Barbara, Mt. Santa Barbara, 11.5km S & 5.6km W Peña Blanca <14°57'N; 88°05'W> 1800m, 20.vi.1994 (Brooks & Ashe) #163, ex decaying slash, 2 ♂♂ and 2 ♀♀ in MHNG and SEMC; same data, but #164, ex treefall litter, 1 ♂ and 2 ♀♀ in SEMC. – NICARAGUA, El Cerro Cimborazo <13°02'N; 85°56'W> 1400m, 20.xi.1971 (Stockwell) 1 ♂ in FMNH.

Description: Habitus as in Fig. 6. Combined length of pronotum and elytra = 1.4-1.5 mm; maximal pronotal width = 1.0-1.1 mm. Body dark brown wih appendages slightly paler; antennomeres 10-11 paler than antennomeres 1-9. Dorsal pubescence denser on head and pronotum than on elytral disc, becoming denser along medial groove of pronotum and on anterior portion of elytral disc; frontal setae directed forward; elytral and pronotal setae slightly arcuate, recumbent; metasternal pubescence becoming denser anteriorly, longer than that of prosternum; pubescence on abdominal tergites parallel, uniform; that on sternites IV-VII uniform. Frons, pronotum, lateral portion of elytral disc and anterior portion of prohypomera granulate; frontal granulation conspicuous, with granula about as high as their diameter, or higher; metasternum coarsely granulofossulate.

Frons forming above clypeus a sharp ridge, the latter finely evenly carinate, weakly arcuate in middle and laterally oblique in dorsal view; mesal portion of disc strongly evenly convex in lateral view; U-shaped frontal impression shallow. Temples strongly convex in dorsal view. Antennae (Fig. 182) 2.1-2.3 times longer than pronotum.

Pronotum (Fig. 186) with center strongly convex in frontal view; disc deeply depressed near middle of lateral edges, shallowly depressed along anterior margin, posterior margin and posterior portion of medial groove; the latter slightly arcuate in lateral view, deep, parallel-sided; hypomera ridged from anterior margin to laterobasal angle, disc without pit. Prosternal medial ridge absent. Scutellum with anterior margin rounded and posterior margin slighly arcuate toward acutely angular apex.

Elytra gradually widened (Fig. 6); humeral callus low, moderately convex; disc with low swellings, moderately depressed posteriorly along lateral edge; the latter finely carinate, indistinctly denticulate, slightly arcuate in dorsal view.

Abdominal sternites II and III with medial processes as in Fig. 184, posterior portion of process of sternite III straight.

Male: Frontoclypeal area not modified. Protarsomere 1 lacking tenent setae. Mesofemora (Fig. 175) as long as metafemora. Mesotibiae (Fig. 174) shorter than metatibiae (Fig. 173). Metatarsomeres 1 about as long as combined length of meta - tarsomeres 2-4. Peg-like setae arranged in a single row on mesotrochanters (Fig. 175), grouped in a field on mesotibiae and metatibiae, and absent from protrochanters, profemora, protibiae, mesofemora, metatrochanters and metafemora. Apex of abdominal tergite VIII as in Figs 176, 178. Sternite VIII as in Fig. 177. Sternite IX lacking subbasal protuberance. Aedeagus as in Figs 171-172.

Female: Abdominal tergite VIII (Figs 185, 187) bearing medioapical projection. Sternite VIII as in Fig. 183. Genital segments as in Figs 179-181; gonocoxal plate lacking a mediodorsal ridge.

Distribution and natural history: The species is known from Costa Rica, Guatemala, Honduras and Nicaragua. It was collected by sifting leaf litter or using flight intercept and faeces traps in mesic hardwood forests and cloud forests at elevations ranging between 1300 and 3100m. It is the most widespread Megarthrus treated in this study.

Comments: Among Neotropical *Megarthrus*, *M. zunilensis* is particularly notable by the gonocoxal plate lacking a mediodorsal ridge in females, in combination with the frontal setae directed forward and the eleventh antennomere ovoid. The latter two characters are shared only with *M. flavosignatus*, of which only the male is known and which has a differently shaped aedeagus. See comments under *M. flavosignatus*.

DISCUSSION

Systematics: The *Megarthrus* fauna of the Americas south of the Rio Grande is rather homogeneous. Except for the Mexican *M. altivagans*, all the species typically share the presence of a long prohypomeral ridge extended posteriorly to the laterobasal angle, the frontal pubescence directed forward, the terminal antennomere piriform, and the lack of adventral adhesive setae on the first male protarsomere, forming the *M. inaequalis*-supergroup. Amazingly this combination of characters is found elsewhere only in the *M. auricola*-group, which contains all the New Guinean *Megarthrus*, suggesting a close historical connection between these two faunas (Cuccodoro, 1998).

Megarthrus altivagans has the frontal setae directed backward, lacks a prohypomeral ridge, and bears adventral adhesive setae on the first male protarsomere. This combination of characters is typical of the *M. depressus*-supergroup, which contains most of the Nearctic, Palaearctic and Afrotropical species of the genus.

Natural history: The Neotropical *Megarthrus* appear to be confined to mountainous forested areas, with a marked preference for elevations ranging from 1500 to 2100 m a. s. l. Of the species treated here, nine have been collected within this altitudinal range, while only three were found between 1200-1500 m, and three between 2100-4000 m. They have been found on and in fungi, in carrion, leaf litter and other decaying plant debris, by sifting or by using flight interception, human faeces and squid carrion traps. All the specimens examined possess fully developed wings, and many of them have been collected in flight.

Diversity and distributional pattern: Of the eleven *Megarthrus* species treated in this study, eight are from the mountains of Central America; the others are from Mexico (*M. altivagans*), northern Argentina (*M. ogloblini*) and Peru (*M. machu*). These species, however, represent only a poor fraction of the real diversity of the genus in the Neotropics. In fact, some 90% of the specimens I had on loan for the present study belong to undescribed species. In this material (mainly from CNCI, FMNH & SEMK) I recognised additional eleven species species from Mexico, eleven species from Costa Rica, Guatemala, Honduras, Nicaragua and Panama, and fifteen species from Bolivia, southern Brazil, Columbia, Equator, Peru and Venezuela. These species all seem to be confined to a particular mountain, or at most a mountain range. As far as can be seen at the moment, there is no shared *Megarthrus* species between Mexico and North America, and the faunas of Mexico, of Central America and of South

America seem also entirely distinct. Moreover, the two latter areas of endemism appear inhabited almost exclusively by species of the *M. inaequalis* super-group. With a total of at least forty-eight species, it appears that the diversity of *Megarthrus* in the Neotropics exceeds by three times that of the Nearctic realm (twelve species; Cuccodoro & Löbl, 1996) and is even greater than that of Subsaharan Africa (forty-two species; Cuccodoro & Löbl, 1995; Cuccodoro, 1999). Nevertheless, it remains relatively low compared to that of North India and Nepal (at least sixty-four species), where the genus is additionally phylogenetically much more diverse (Cuccodoro, 2003).

AKNOWLEDGEMENTS

The following colleagues have generously lent specimens examined in the present study: the late J. S. Ashe, SEMK, N. Diaz and L. Fernandez, MLPA, M. K. Thayer and A. F. Newton Jr., FMNH, and A. Smetana, CNCI. I also thank F. Marteau, MHNG, for scanning the line drawings and numbering the figures.



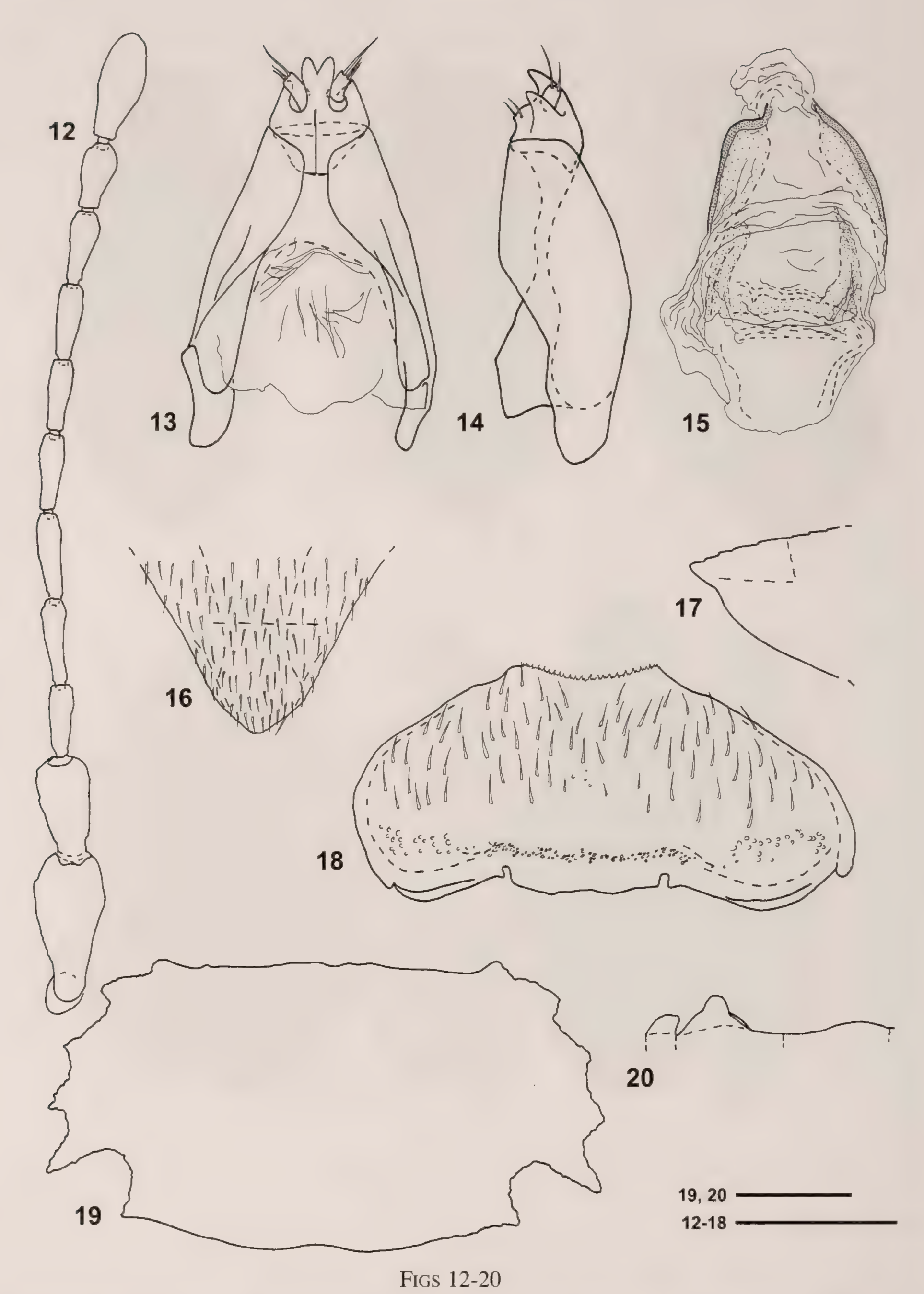
FIGS 1-6

Megarthrus, habitus. (1) *M. altivagans* Bernhauer, female, genital segments dissected. (2) *M. mammiger* Bierig, male, genital segments dissected. (3) *M. solitarius* Sharp, male. (4) *M. ogloblini* Bruch, male, holotype. (5) *M. flavosignatus* Bierig, male, genital segments dissected. (6) *M. zunilensis* Sharp, female. Scale bars = 1 mm.



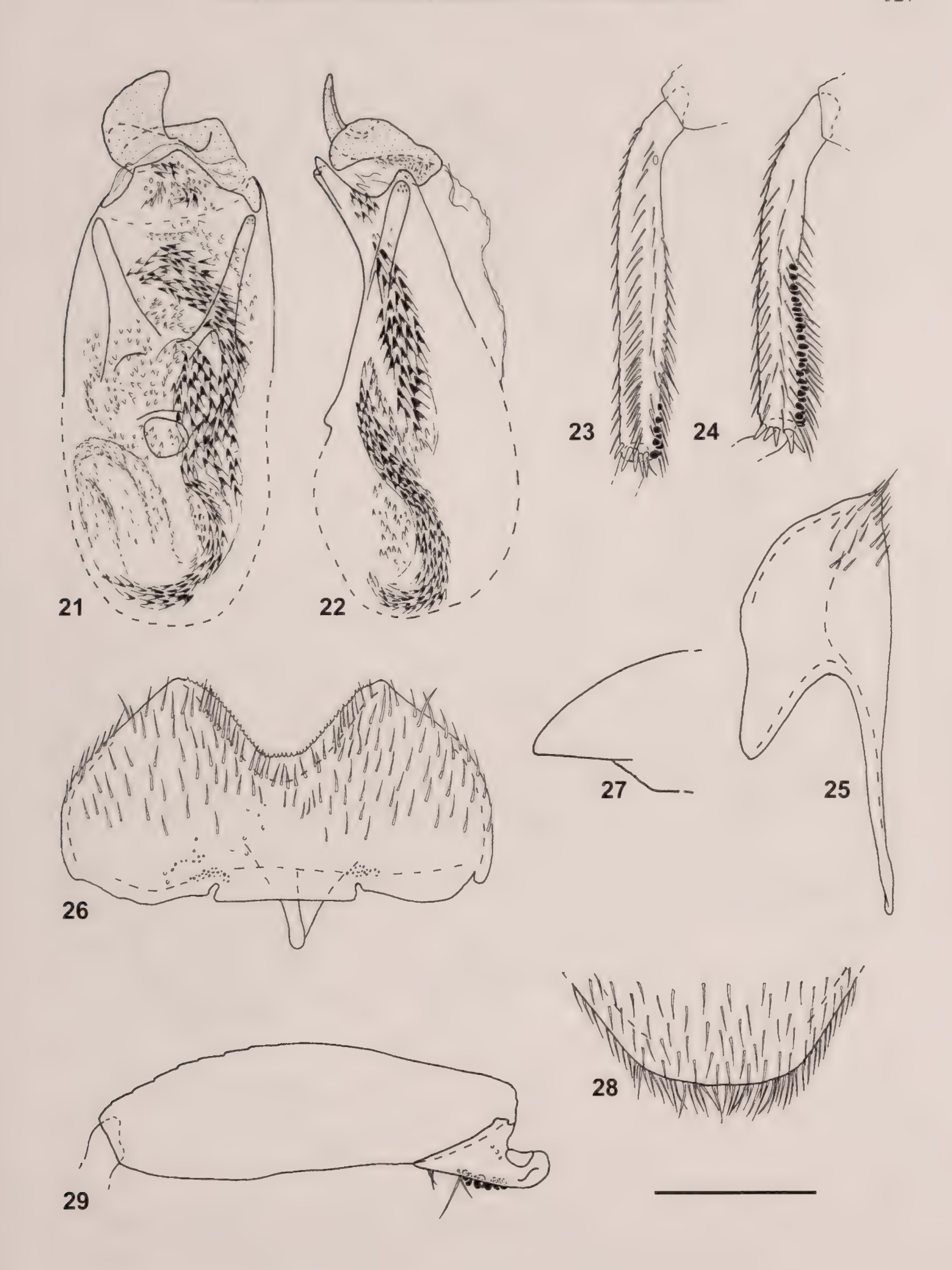
FIGS 7-11

Megarthrus, habitus. (7) *M. bierigi* sp. n., female, genital segments dissected. (8) *M. inaequalis* Bierig, female. (9) *M. mastiger* Bierig, female, genital segments dissected. (10) *M. adelphus* Bierig, female, genital segments dissected. (11) *M. machu* sp. n., male, holotype, genital segments dissected. Scale bars = 1 mm.



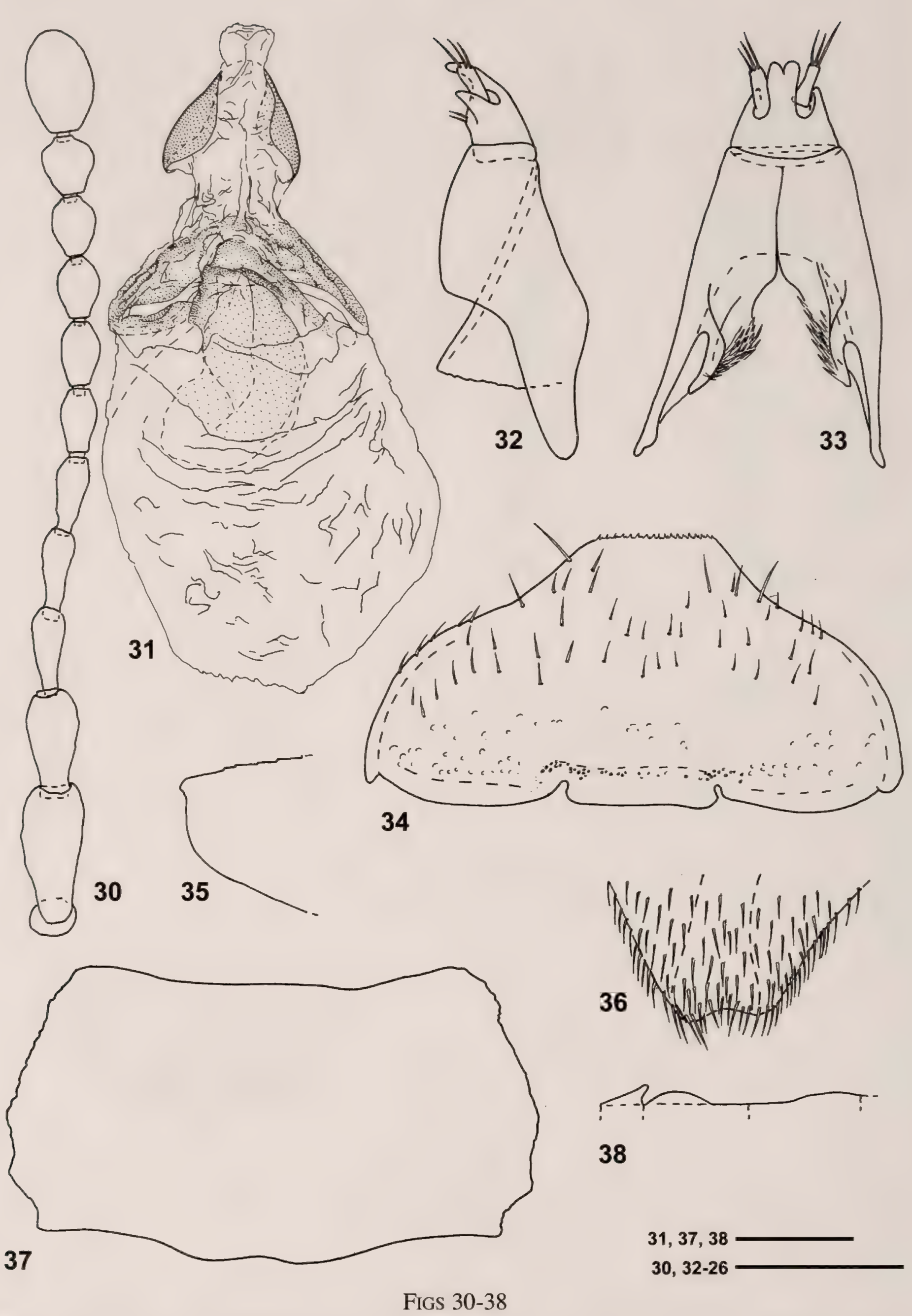
FIGS 12-20

Megarthrus adelphus Bierig; antenna (12); female, genital segments, sternites in dorsal (13) and lateral (14) views, and tergites in ventral view (15); female, apex of abdominal tergite VIII in dorsal (16) and lateral (17) views; female, abdominal sternite VIII in ventral view (18); pronotum (19); medial area of abdominal sternites II-IV (left to right, upside down) in lateral view (20). Scale bars = 0.2 mm.



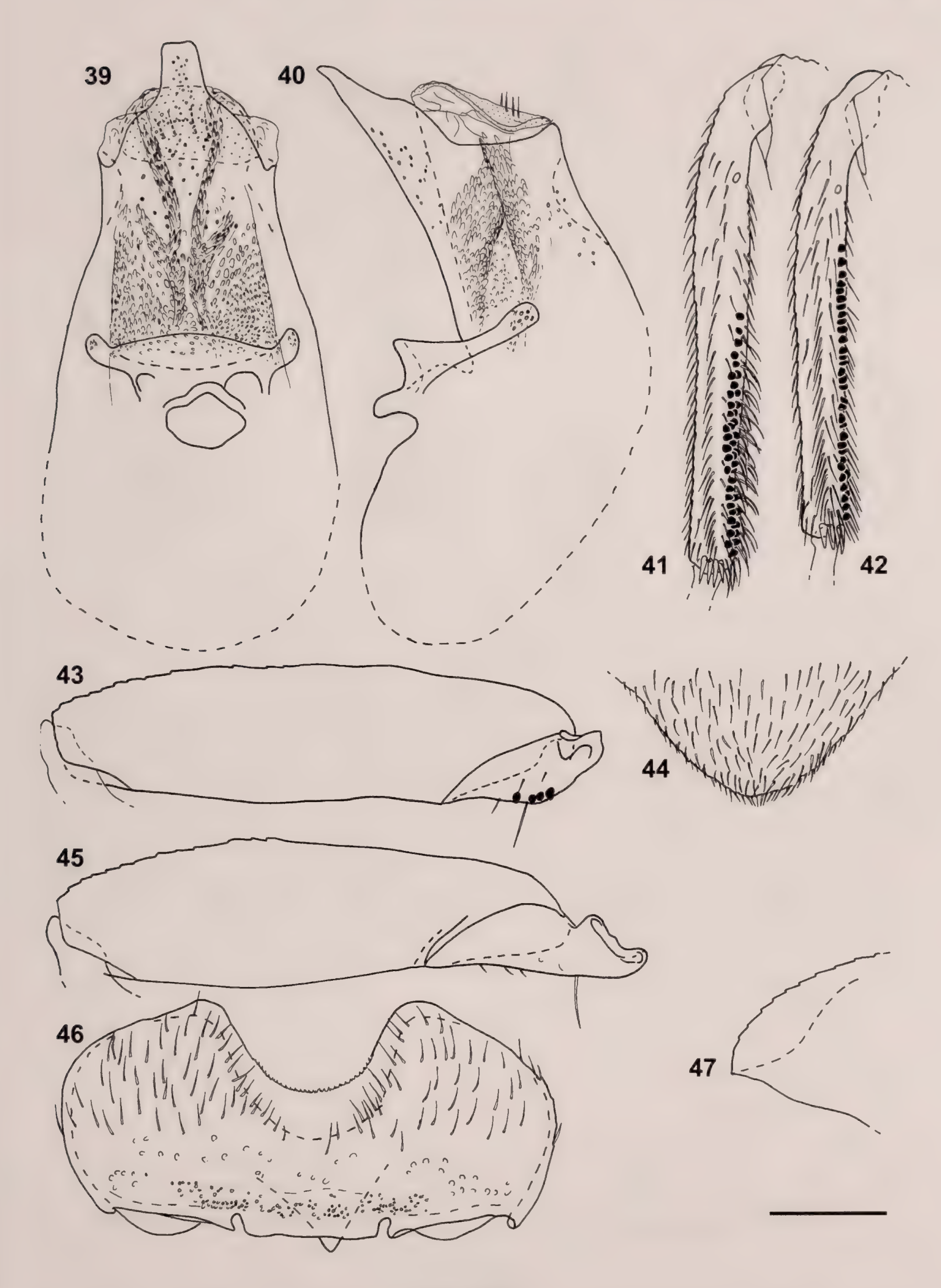
FIGS 21-29

Megarthrus altivagans Bernhauer, male; aedeagus in ventral (21) and lateral (22) views; metatibia (23); mesotibia (24); abdominal hemitergite 9 (25); abdominal sternite VIII in ventral view (26); apex of abdominal tergite VIII in lateral (27) and dorsal (28) views; mesotrochanter and mesofemur (29). Scale bar = 0.2 mm.



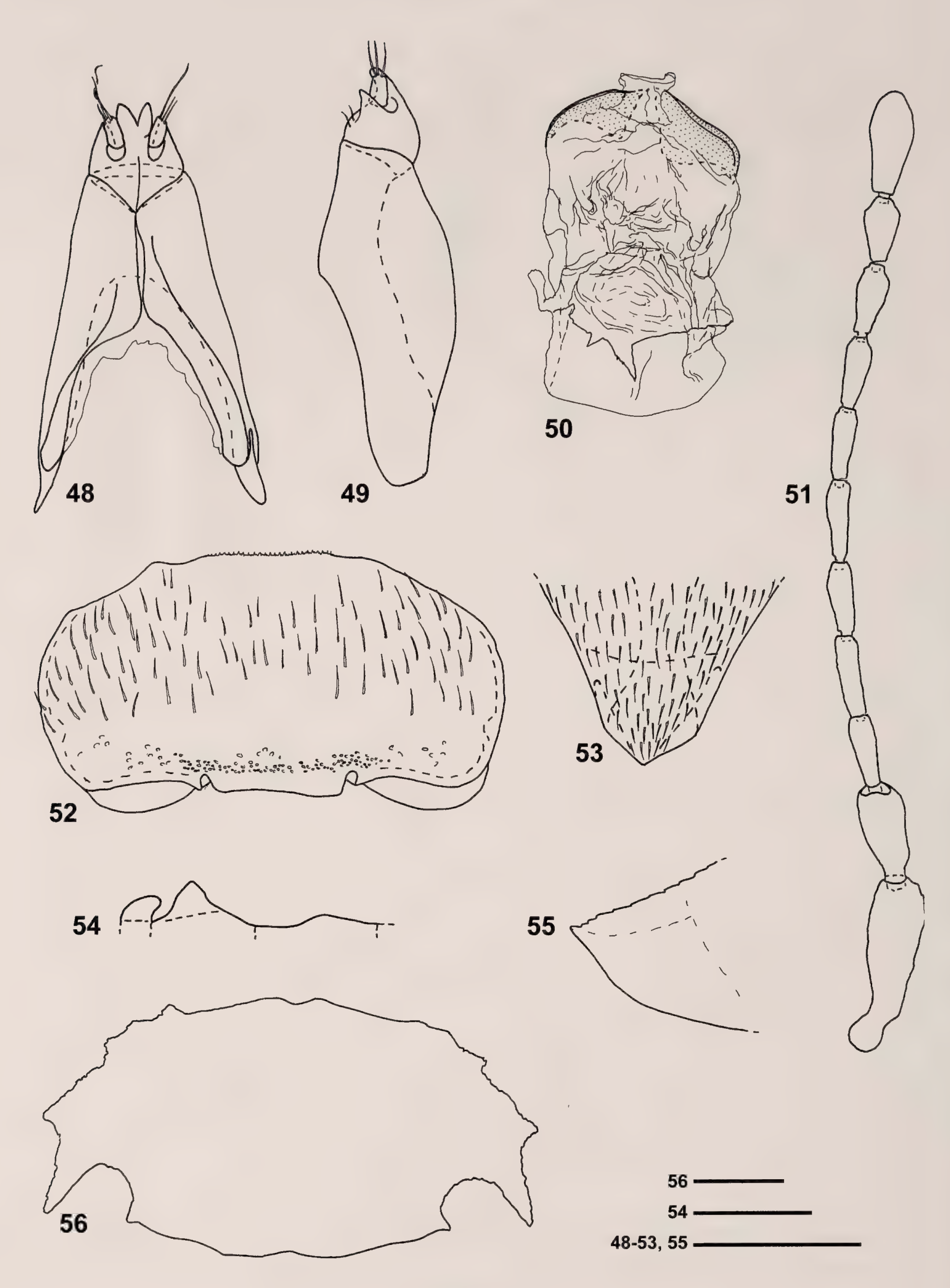
FIGS 30-38

Megarthrus altivagans Bernhauer; antenna (30); female, genital segments, tergites in ventral view (31), and sternites in lateral (32) and dorsal (33) views; female, abdominal sternite VIII in ventral view (34); female, apex of abdominal tergite VIII in lateral (35) and dorsal (36) views; pronotum (37); medial area of abdominal sternites II-IV (left to right, upside down) in lateral view (38). Scale bars = 0.2 mm.



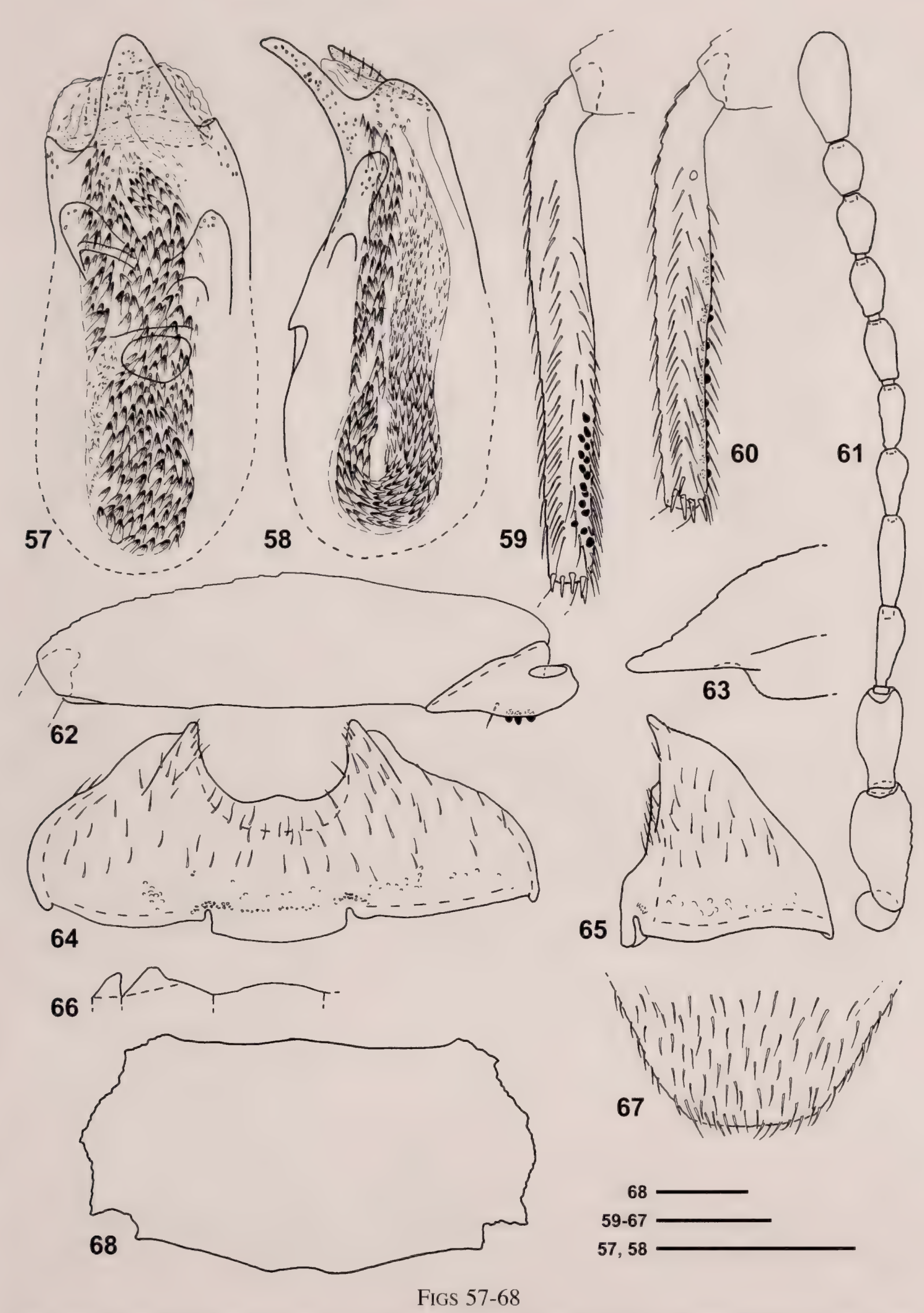
FIGS 39-47

Megarthrus bierigi sp. n., male; aedeagus in ventral (39) and lateral (40) views; metatibia (41); mesotibia (42); mesotrochanter and mesofemur (43); apex of abdominal tergite VIII in dorsal (44) and lateral (47) views; metatrochanter and metafemur (45); abdominal sternite VIII in ventral view (46). Scale bar = 0.2 mm.



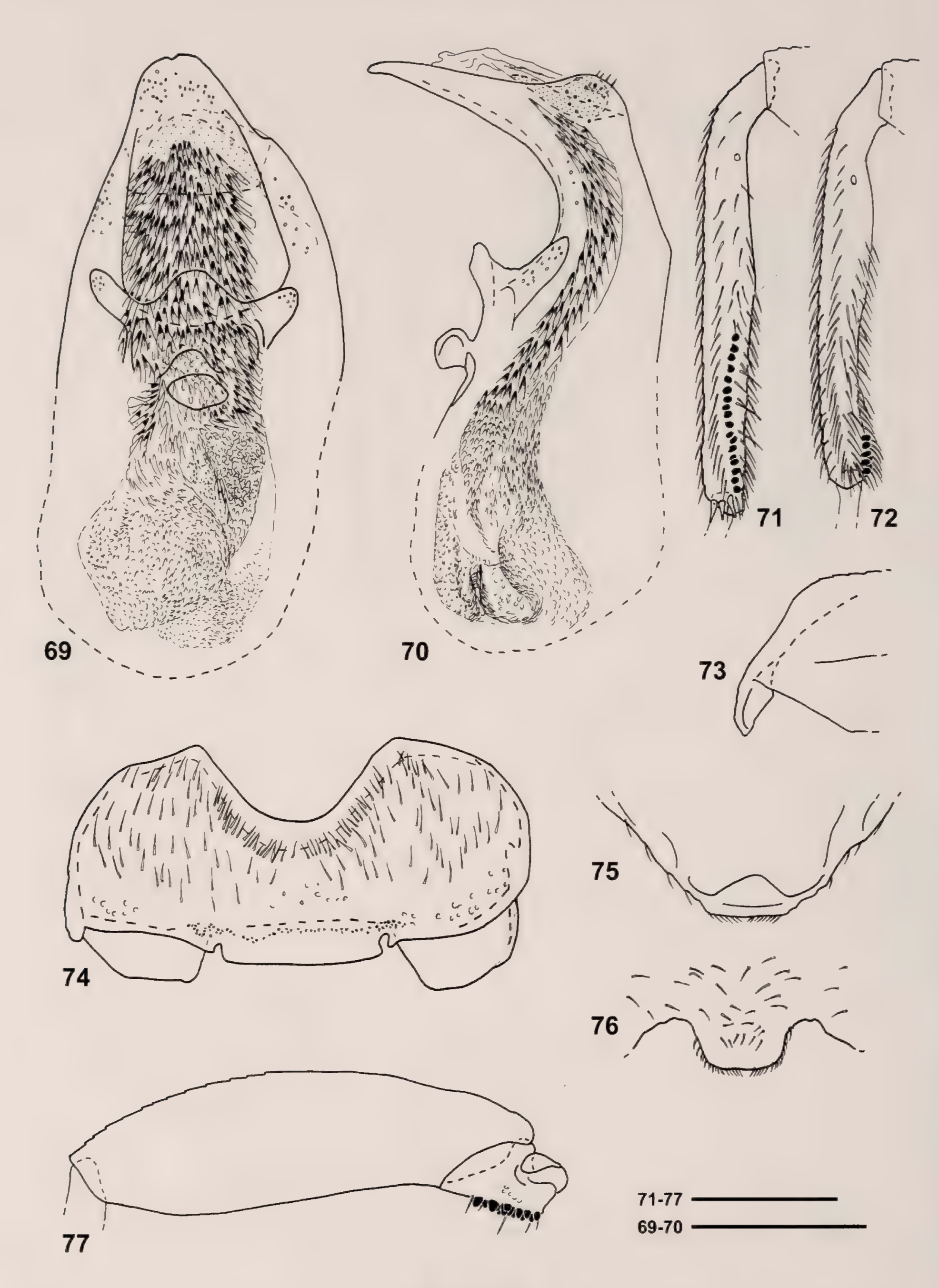
FIGS 48-56

Megarthrus bierigi sp. n.; female, genital segments, sternites in dorsal (48) and lateral (49) views, and tergites in ventral view (50); antenna (51); female, abdominal sternite VIII in ventral view (52); female, apex of abdominal tergite VIII in dorsal (53) and lateral (55) views; medial area of abdominal sternites II-IV (left to right, upside down) in lateral view (55); pronotum (56). Scale bars = 0.2 mm.



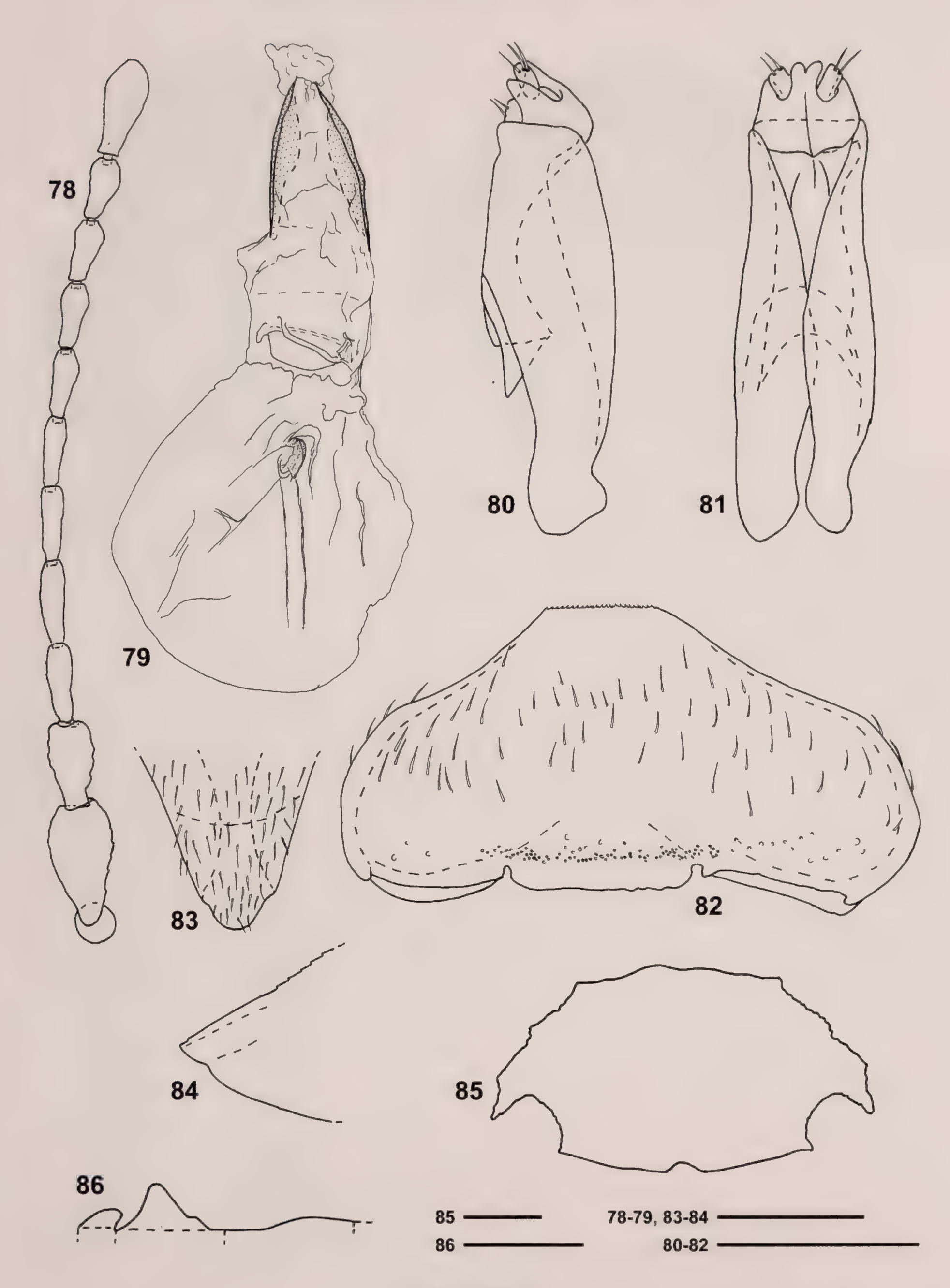
FIGS 57-68

Megarthrus flavosignatus Bierig, male; aedeagus in ventral (57) and lateral (58) views; metatibia (59); mesotibia (60); antenna (61); mesotrochanter and mesofemur (62); apex of abdominal tergite VIII in lateral (63) and dorsal (67) views; abdominal sternite VIII in ventral (64) and lateral (65) views; medial area of abdominal sternites II-IV (left to right, upside down) in lateral view (66); pronotum (68). Scale bars = 0.2 mm.



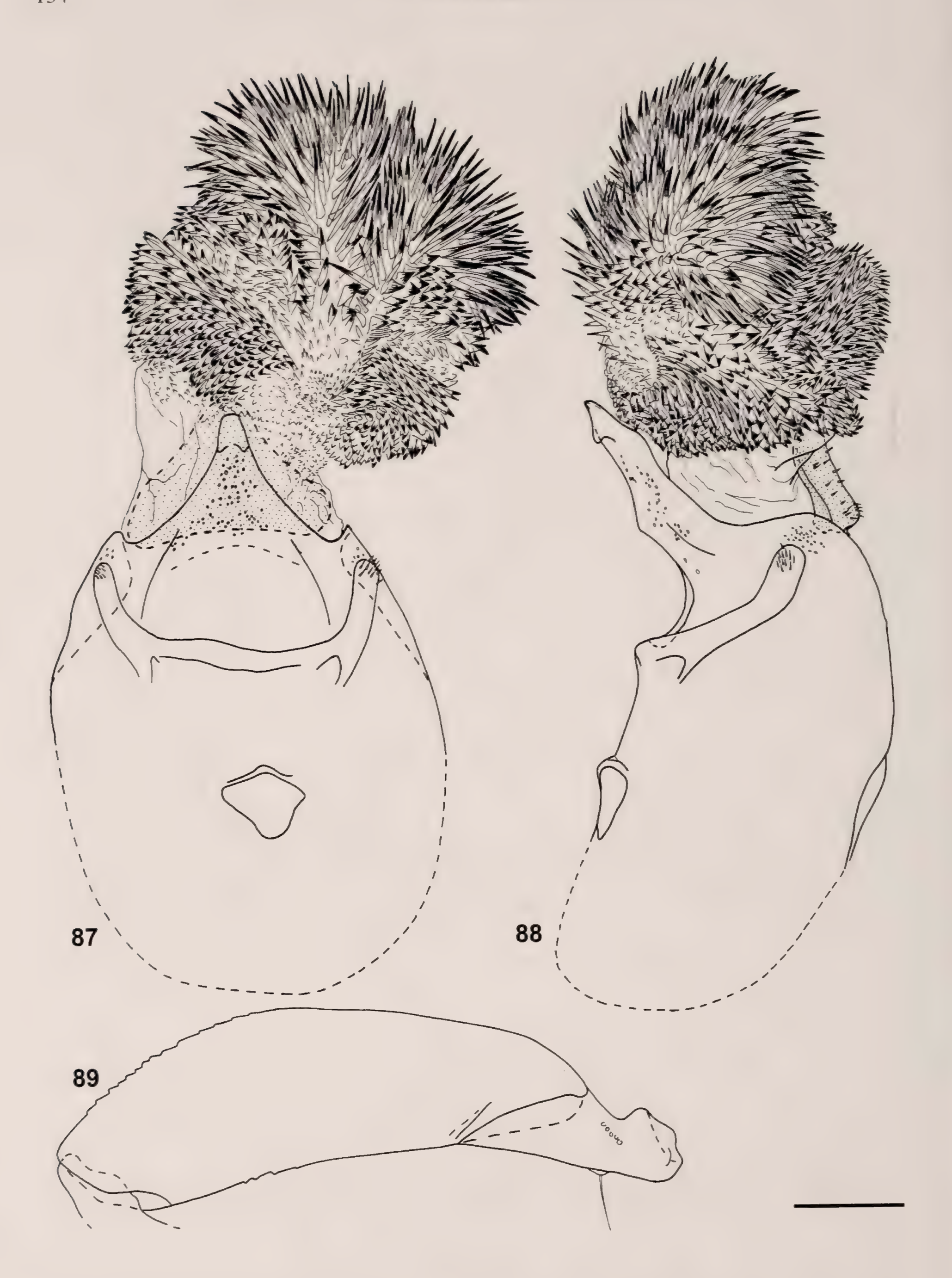
FIGS 69-77

Megarthrus inaequalis Bierig, male; aedeagus in ventral (69) and lateral (70) views; metatibia (71); mesotibia (72); apex of abdominal tergite VIII in lateral (73), ventral (75) and posterior (76) views; abdominal sternite VIII in ventral view (74); mesotrochanter and mesofemur (77). Scale bars = 0.2 mm.

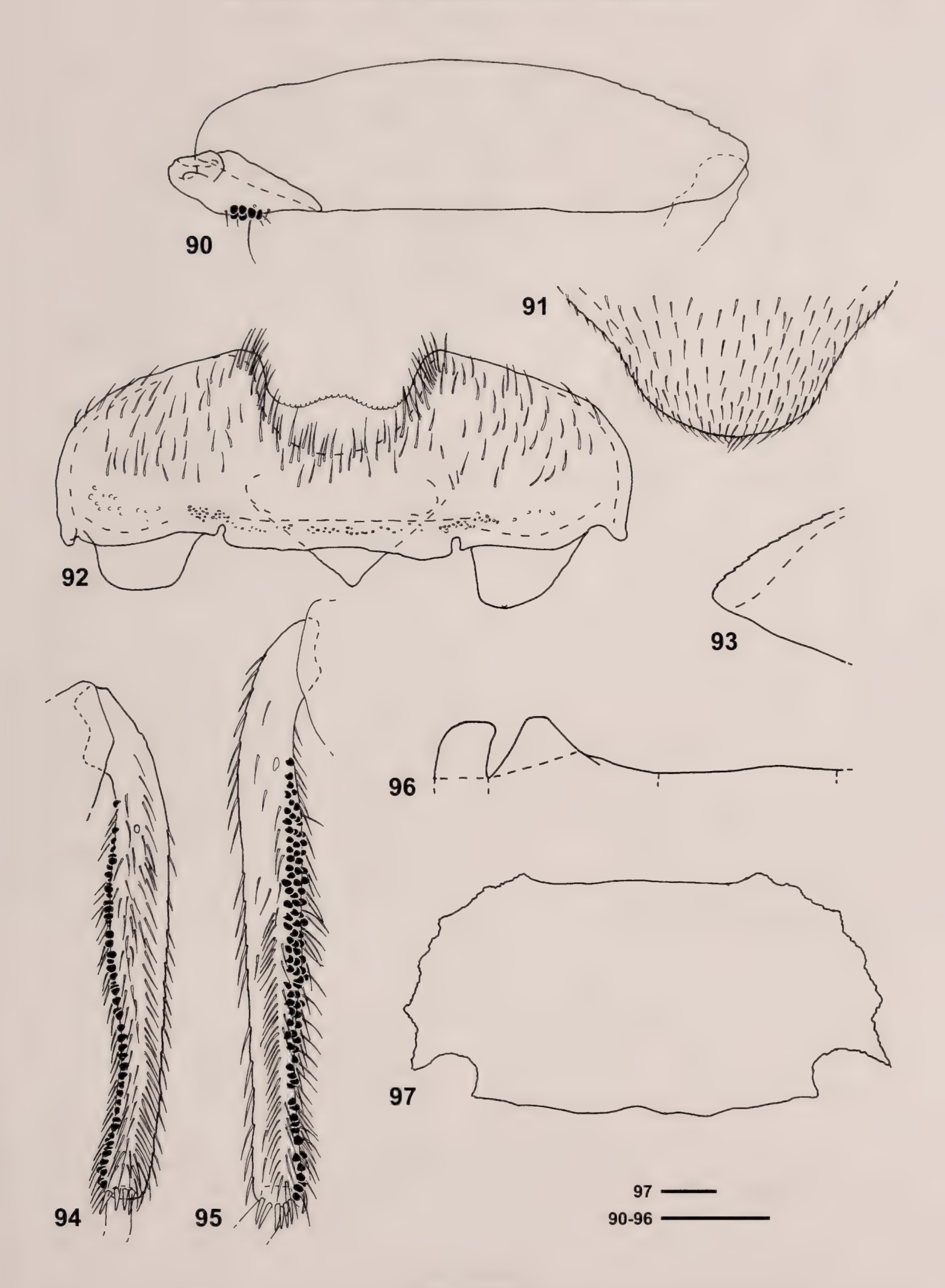


FIGS 78-86

Megarthrus inaequalis Bierig; antenna (78); female, genital segments, tergites in ventral view (79), and sternites in lateral (80) and dorsal (81) views; female, abdominal sternite VIII in ventral view (82); female, apex of abdominal tergite VIII in dorsal (83) and lateral (84) views; pronotum (85); medial area of abdominal sternites II-IV (left to right, upside down) in lateral view (86). Scale bars = 0.2 mm.

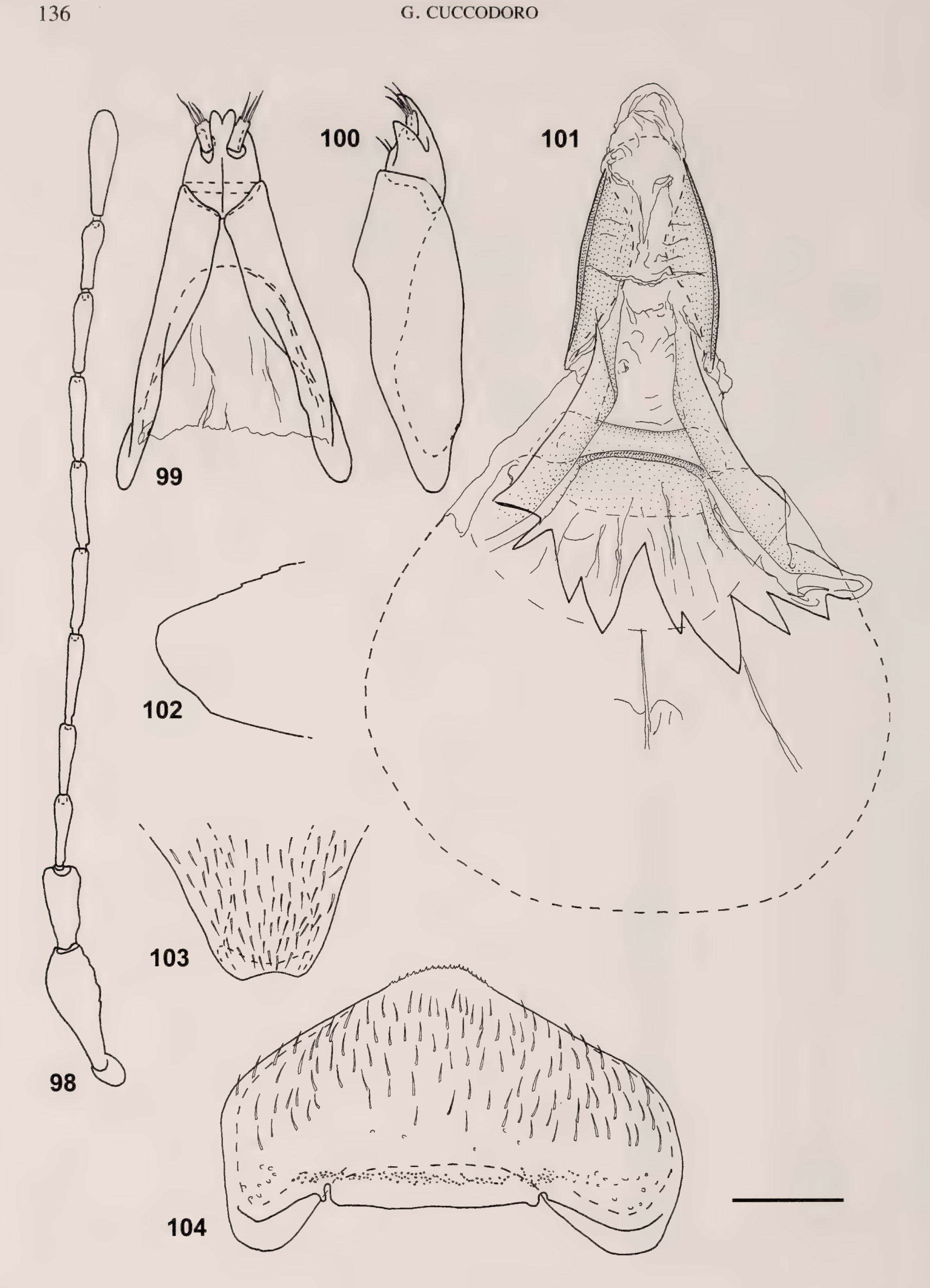


FIGS 87-89
Megarthrus machu sp. n., male; aedeagus (internal sac extruded) in ventral (87) and lateral (88) views; metatrochanter and metafemur (89). Scale bar = 0.2 mm.



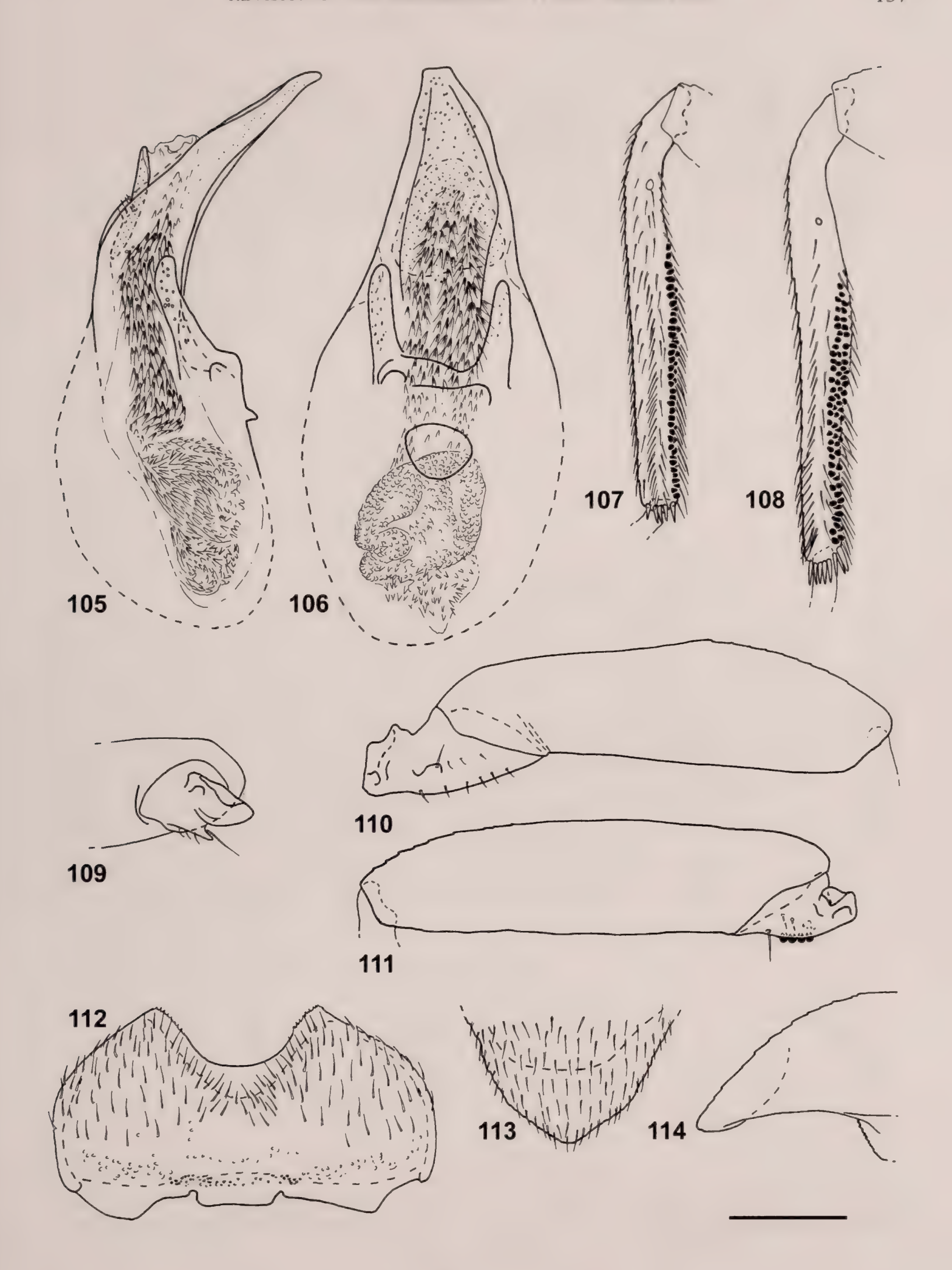
FIGS 90-97

Megarthrus machu sp. n.; male, mesotrochanter and mesofemur (88); male, apex of abdominal tergite VIII in dorsal (91) and lateral (93) views; male, abdominal sternite VIII in ventral view (92); male, mesotibia (94); male, metatibia (95); pronotum (97). Scale bars = 0.2 mm.



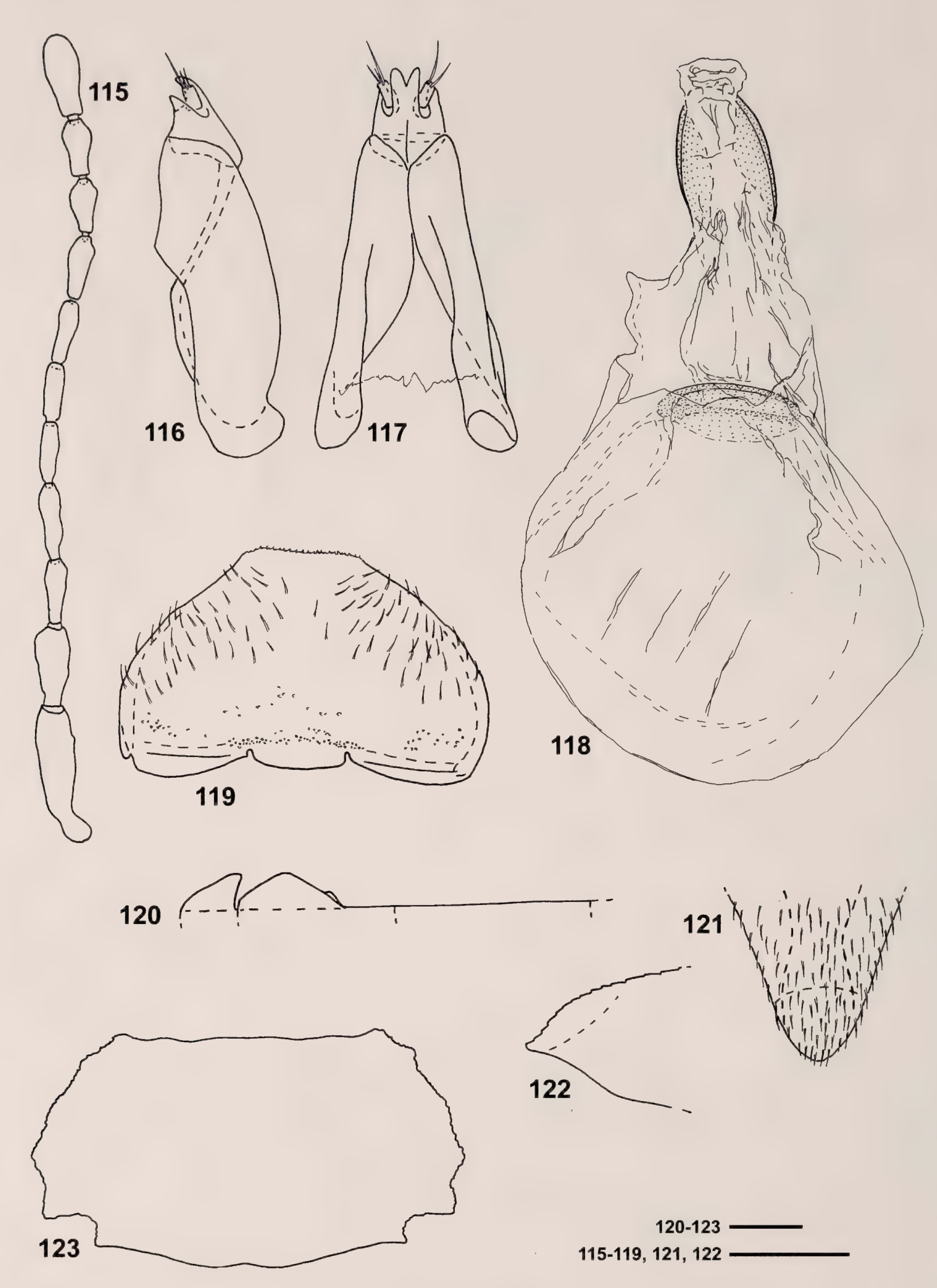
FIGS 98-104

Megarthrus machu sp. n.; antenna (98); female, genital segments, sternites in dorsal (139) and lateral (100) views, and tergites in ventral view (101); female, apex of abdominal tergite VIII in lateral (102) and dorsal (103) views; female, abdominal sternite VIII in ventral view (104). Scale bar = 0.2 mm.



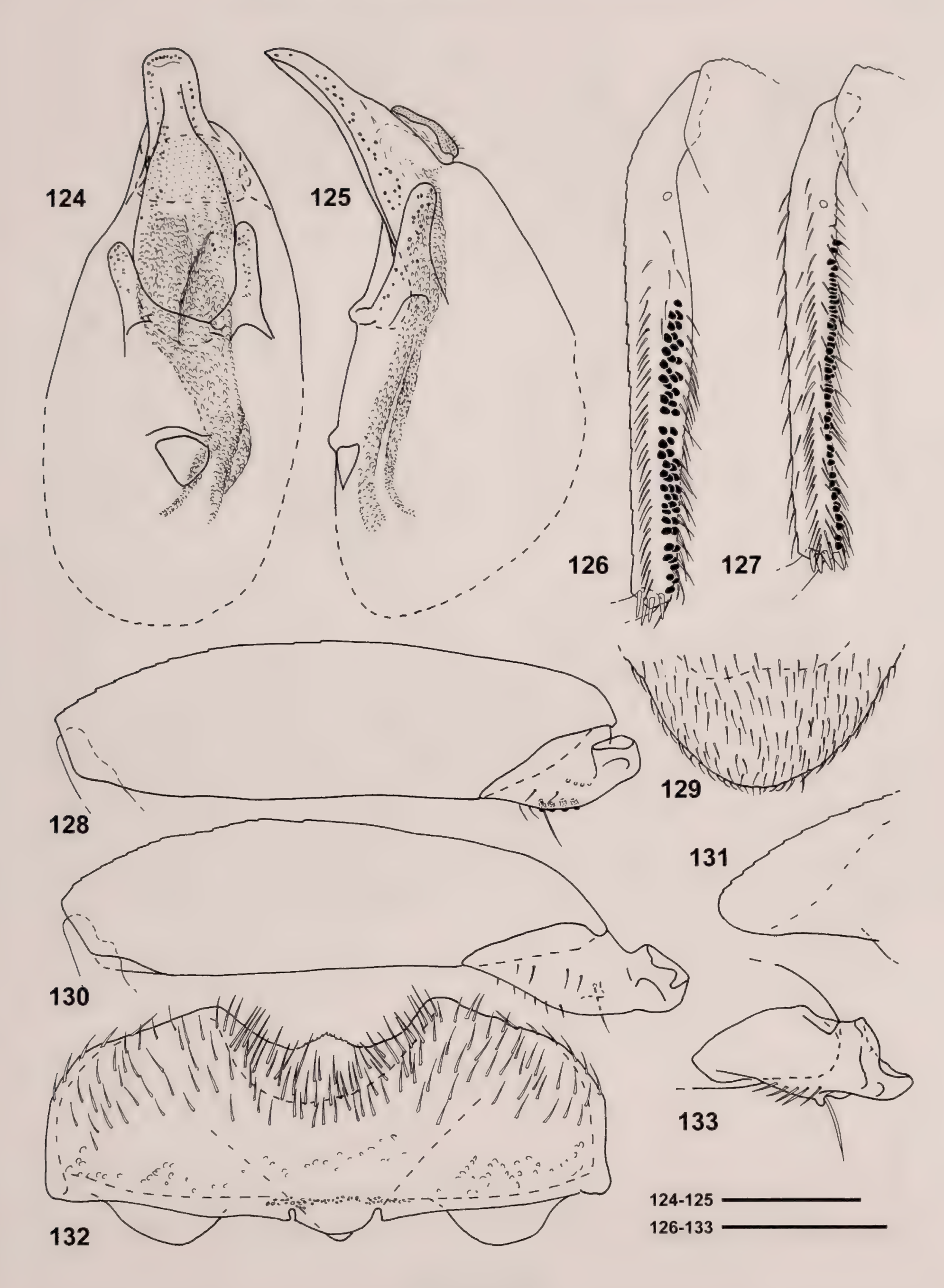
FIGS 105-114

Megarthrus mammiger Bierig, male; aedeagus in lateral (105) and ventral (106) views; meso - tibia (107); metatibia (108); metatrochanter in mesal view (109); metatrochanter and metafemur (110); mesotrochanter and mesofemur (111); abdominal sternite VIII in ventral view (112); apex of abdominal tergite VIII in dorsal (113) and lateral (114) views. Scale bar = 0.2 mm.



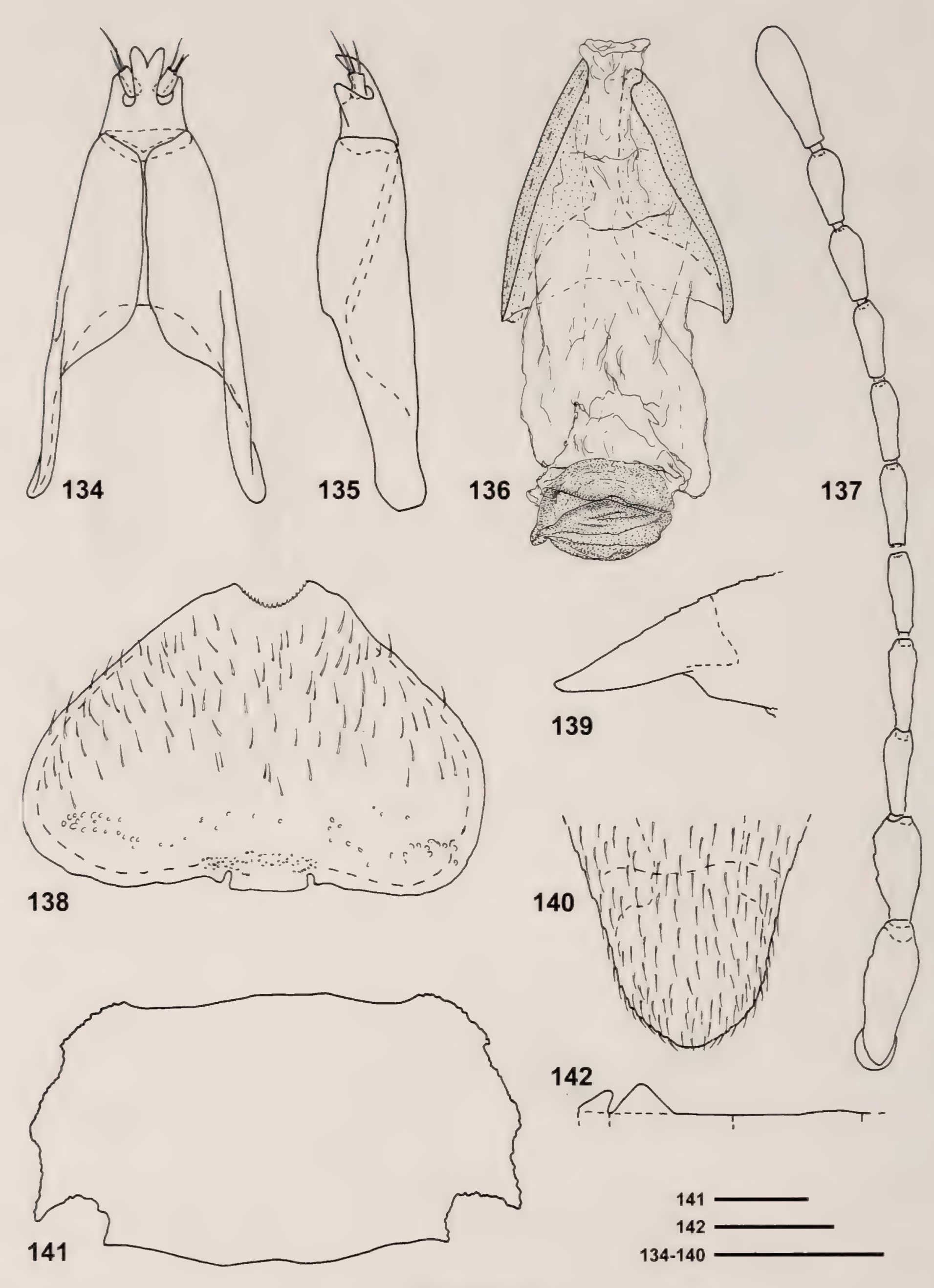
FIGS 115-123

Megarthrus mammiger Bierig; antenna (115); female, genital segments, sternites in lateral (116) and dorsal (117) views, and tergites in ventral view (118); female, abdominal sternite VIII in ventral view (119) ; medial area of abdominal sternites II-IV (left to right, upside down) in lateral view (120); female, apex of abdominal tergite VIII in dorsal (121) and lateral (122) views; pronotum (123). Scale bars = 0.2 mm.



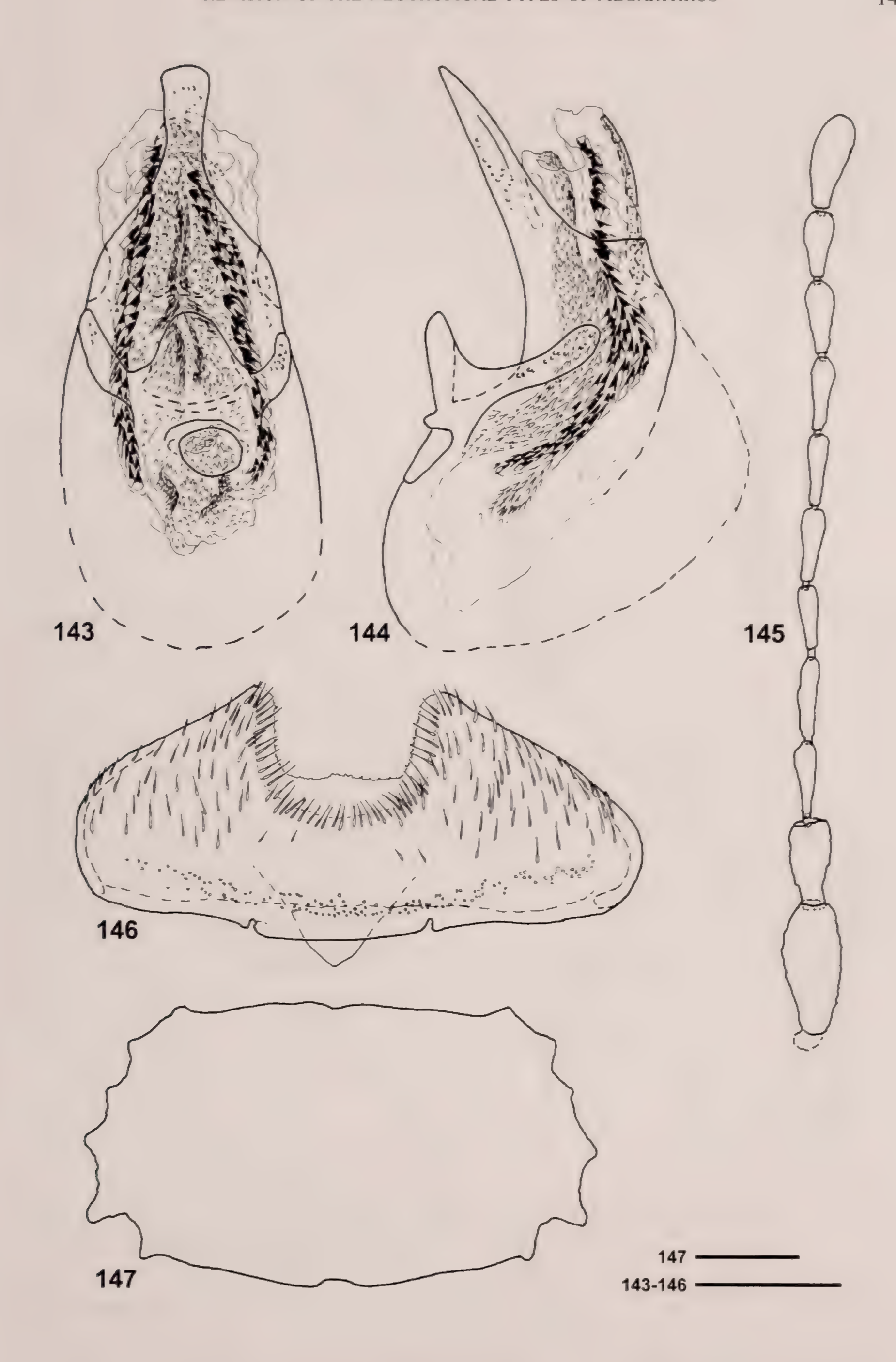
FIGS 124-133

Megarthrus mastiger Bierig, male; aedeagus in ventral (124) and lateral (125) views; metatibia (126); mesotibia (127); mesotrochanter and mesofemur (128); apex of abdominal tergite VIII in dorsal (129) and lateral (131) views; metatrochanter and metafemur (130); abdominal sternite VIII in ventral view (132); metatrochanter in mesal view (133). Scale bars = 0.2 mm.



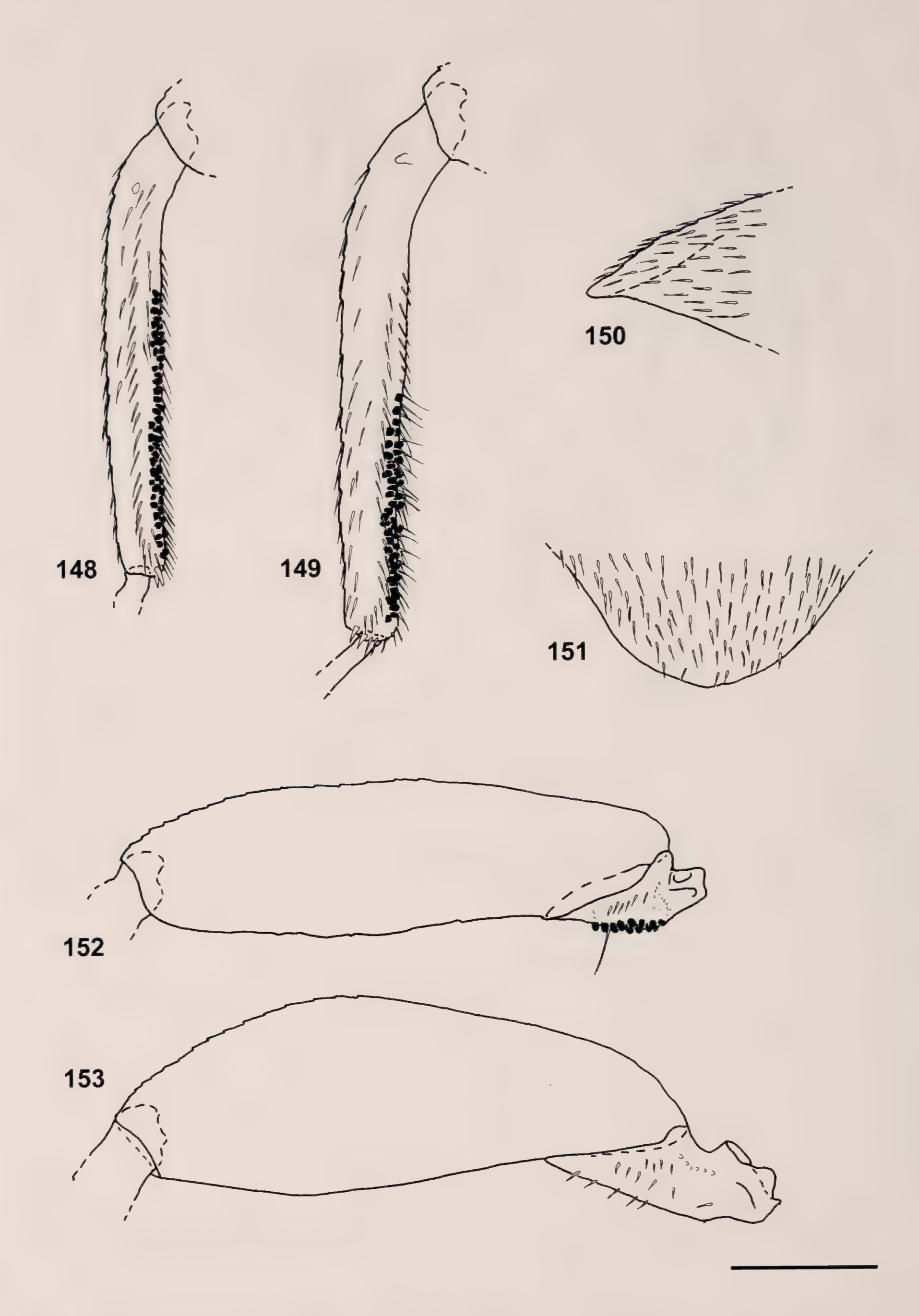
Figs 134-142

Megarthrus mastiger Bierig; female, genital segments, sternites in dorsal (134) and lateral (135) views, and tergites in ventral view (136); antenna (137); female, abdominal sternite 8 in ventral view (138) ; female, apex of abdominal tergite 8 in lateral (139) and dorsal (140) views; pronotum (141); medial area of abdominal sternites II-IV (left to right, upside down) in lateral view (142). Scale bars = 0.2 mm.



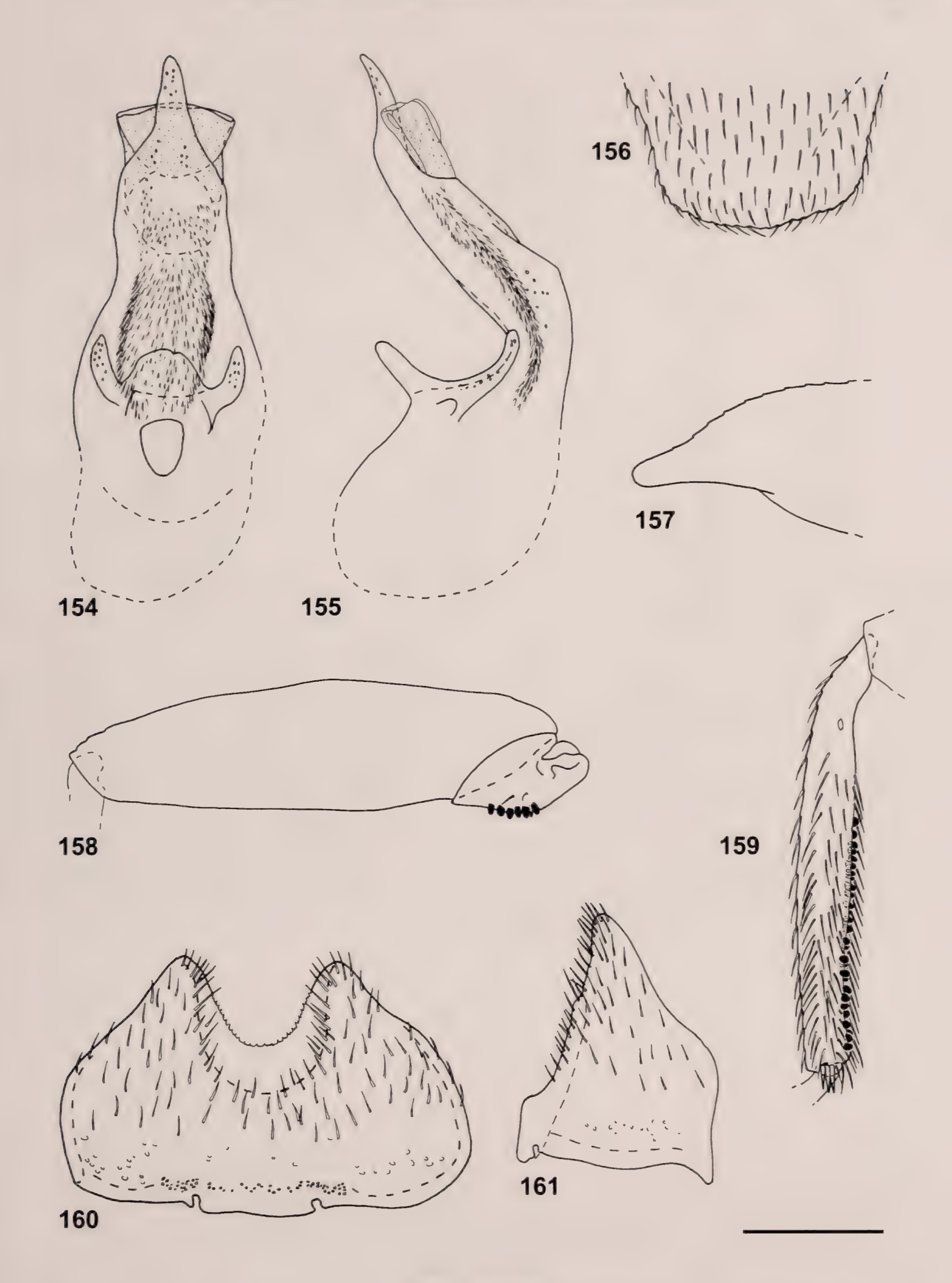
FIGS 143-147

Megarthrus ogloblini Bruch, male; aedeagus in ventral (143) and lateral (144) views; antenna (145); abdominal sternite VIII in ventral view (146); pronotum (147). Scale bars = 0.2 mm.



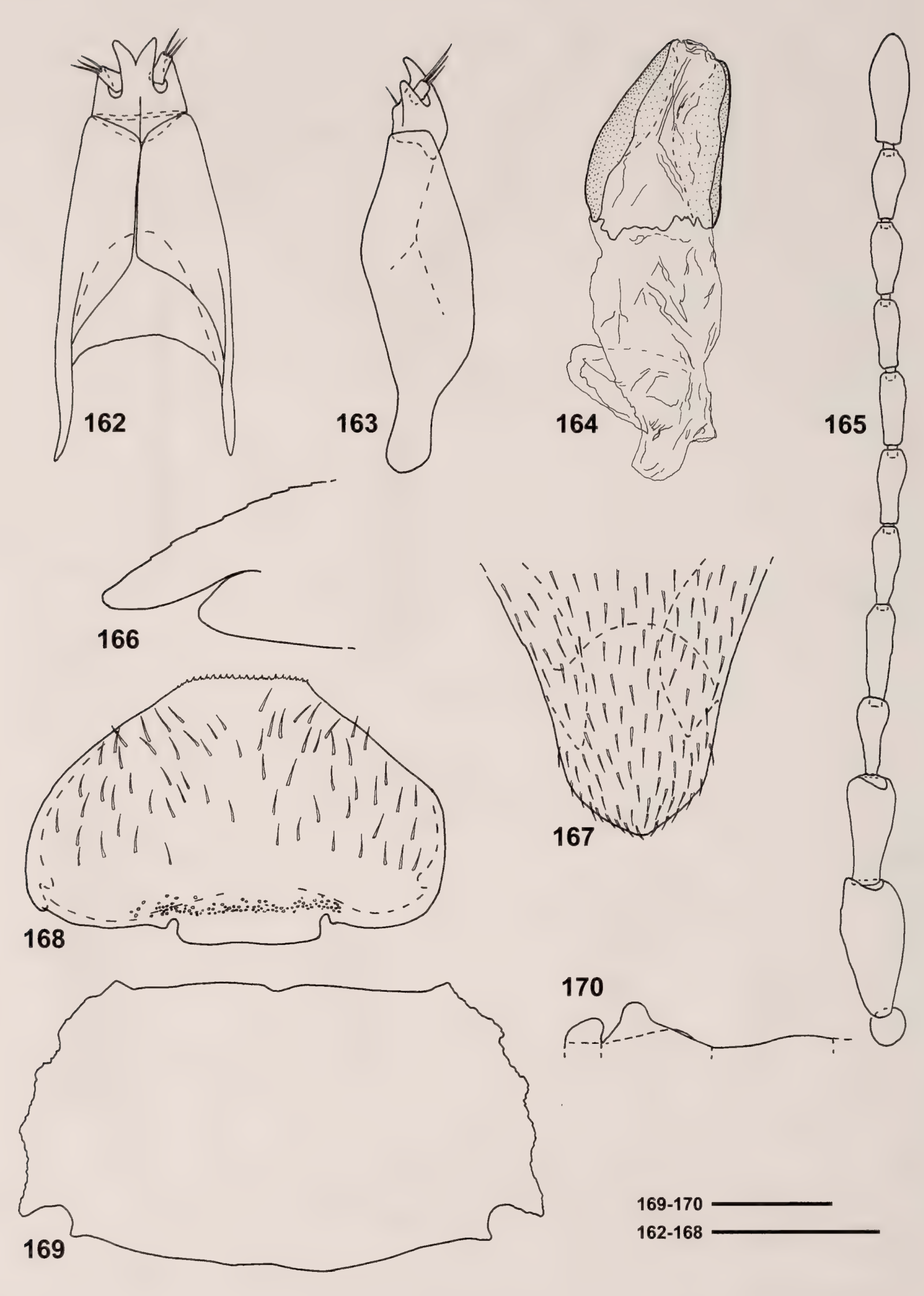
Figs 148-153

Megarthrus ogloblini Bruch, male; mesotibia (148); metatibia (149); apex of abdominal tergite VIII in lateral (150) and dorsal (151) views; mesotrochanter and mesofemur (152); metatrochanter and metafemur (153). Scale bar = 0.2 mm.



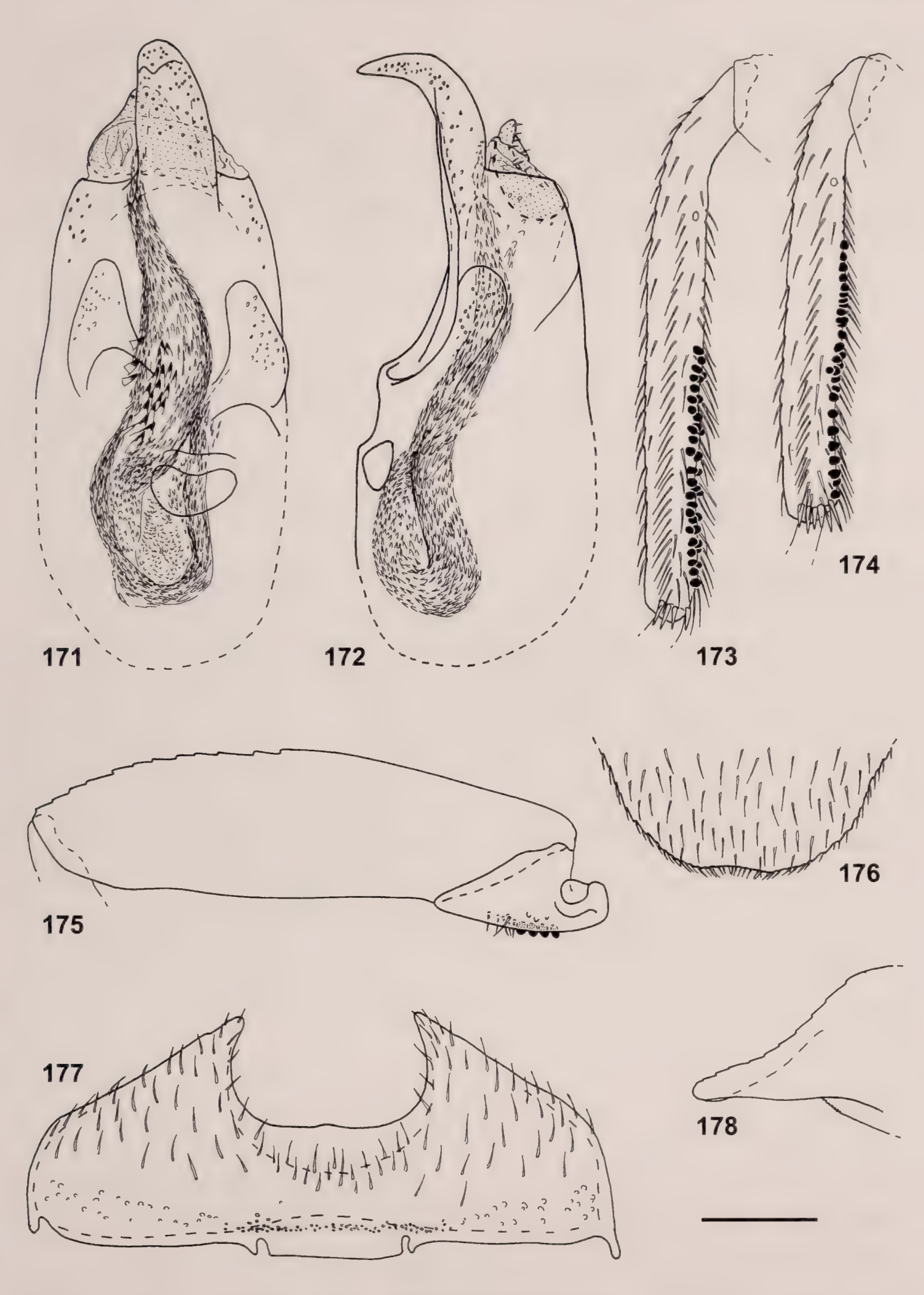
FIGS 154-161

Megarthrus solitarius Sharp, male; aedeagus in ventral (154) and lateral (155) views; apex of abdominal tergite VIII in dorsal (156) and lateral (157) views; mesotrochanter and mesofemur (158); mesotibia (159); abdominal sternite VIII in ventral (160) and lateral (161) views. Scale bar = 0.2 mm.



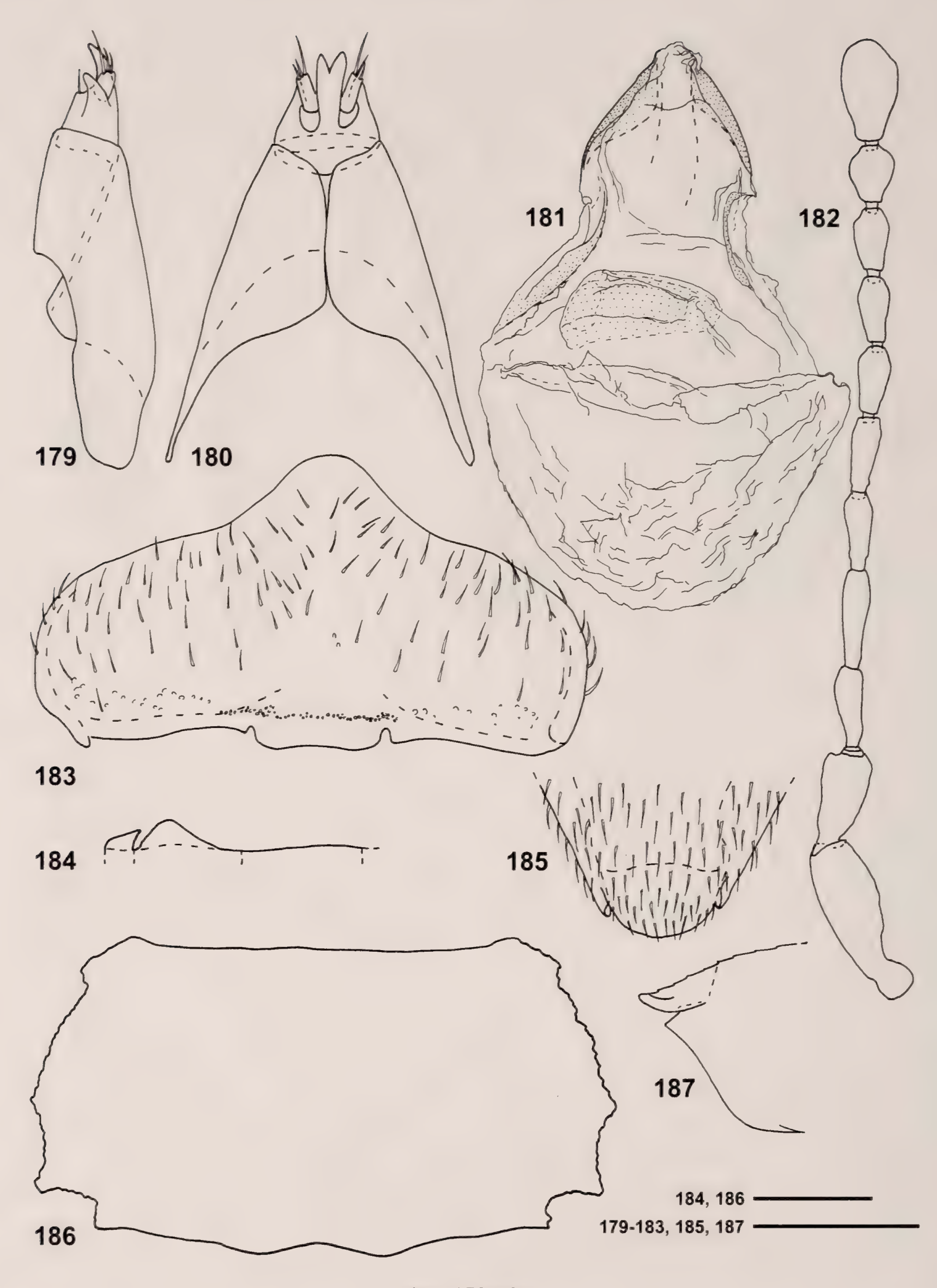
FIGS 162-170

Megarthrus solitarius Sharp; female, genital segments, sternites in dorsal (162) and lateral (163) views, and tergites in ventral view (164); antenna (165); female, apex of abdominal tergite VIII in lateral (166) and dorsal (167) views; female, abdominal sternite VIII in ventral view (168); pronotum (169); medial area of abdominal sternites II-IV (left to right, upside down) in lateral view (170). Scale bars = 0.2 mm.



FIGS 171-178

Megarthrus zunilensis Sharp, male; aedeagus in ventral (171) and lateral (172) views; metatibia (173); mesotibia (174); mesotrochanter and mesofemur (175); apex of abdominal tergite VIII in dorsal (176) and lateral (178) views; abdominal sternite VIII in ventral view (177). Scale bar = 0.2 mm.



FIGS 179-187

Megarthrus zunilensis Sharp; female, genital segments, sternites in lateral (179) and dorsal (180) views, and tergites in ventral view (181); antenna (182); female, abdominal sternite VIII in ventral view (183) ; medial area of abdominal sternites II-IV (left to right, upside down) in lateral view (184); female, apex of abdominal tergite VIII in dorsal (185) and lateral (187) views; pronotum (186). Scale bars = 0.2 mm.

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Redescription and history of *Vombisidris jacobsoni* (Forel, 1915) (Hymenoptera, Formicidae)

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Redescription and history of *Vombisidris jacobsoni* (Forel, 1915) (Hymenoptera, Formicidae). - *Vombisidris jacobsoni* (Forel, 1915) is redescribed and recognized as a member of the *V. australis* group, as defined by Bolton (1991). A lectotype is designated. In addition, the convoluted history of the two type specimens in the Forel Collection at the Muséum d'Histoire Naturelle, Genève, Switzerland is presented. An additional paralectotype specimen from the Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy is included.

Keywords: Formicidae - Formicoxenini - redescription - lectotype designation

INTRODUCTION

During taxonomic research work for a recent paper (Zettel & Sorger, 2010), I came across Bolton's (1995, 2003) mention of the missing type material for the species *Vombisidris jacobsoni* (Forel, 1915) from the Forel Collection at the Muséum d'Histoire Naturelle, Genève. In order to study this species in more detail and to better understand its history of description, I contacted the curator of the Forel Collection, to find out whether the material considered as lost by Bolton (1995, 2003) had been returned to the collection.

Luckily, it had been and therefore it was possible to borrow and study two syntype specimens and in the process to understand not only the story of the specimens but also the appropriate placement of the species. I was also able to discover an additional specimen in the collections of the Museo Civico di Storia Naturale "Giacomo Doria" in Genova, Italy.

The original description of this species was as *Atopula jacobsoni* Forel, 1915. It was transferred to *Leptothorax* a year later (Forel, 1916) and after some initial specu - lation about its generic combination by Bolton (1995), it was finally transferred to *Vombisidris* by Bolton (2003), even though types were not available for examination at the time. Originally, *Vombisidris* was placed in the myrmicine tribe Leptothoracini Emery, 1914 which was later recognised as a junior synonym of Formicoxenini Forel, 1893 (Bolton, 2003).

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HISTORY OF TYPE SPECIMENS

When Forel (1915: 25-27) originally described *Vombisidris jacobsoni* as *Atopula jacobsoni*, he initially expressed some doubt about the correct generic combination of this species and also of *Atopula ceylonica* (Emery, 1901), now *Paratopula ceylonica*: "Ich hatte damals aus der *A. ceylonica* einen *Leptothorax* gemacht (von *Taylori* For.). Ich bin jetzt noch nicht überzeugt, dass diese Art, und vor allem die *A. jacobsoni* von *Leptothorax* generisch zu unterscheiden sei. Wenn aber Letztere ein *Leptothorax* ist, muss *ceylonica* ebenfalls dazu gezogen werden." [Translation: Back then I had made a *Leptothorax* (from *Taylori* For.) of *A. ceylonica*. I am still not convinced this species and, especially, *A. jacobsoni* are generically separable from *Leptothorax*. If, however, the latter is a *Leptothorax*, then *A. ceylonica* also needs to be placed in *Leptothorax*.] (Forel, 1915: 27). Therefore, it was not surprising that Forel readily accepted Emery's suggestion [in litt.] to place the species in *Leptothorax* just a year later (Forel, 1916: 458): "M. Emery m'écrit qu'il considère mon *Atopula Jacobsoni* (Fauna simalurensis 1915, page 25) comme *Leptothorax*. Je suis d'accord (voir ibidem page 27), ..." [Translation: M. Emery wrote me that he believes my *Atopula Jacobsoni* (Fauna simalurensis 1915, page 25) to be a *Leptothorax*. I am in agreement (see ibidem page 27), ...].

Emery (1924: 250) placed *V. jacobsoni* in the subgenus *Leptothorax (Goniothorax)* Emery, 1896 (today a junior synonym of *Nesomyrmex* W. M. Wheeler, 1910; see Bolton, 2003): "Espèce d'Asie 11. *L. jacobsoni* (Forel), Tijdschr. V. Ent. Vol. 58, p. 25 (1915) ☿ (*Atopula*). Sumatra."

When Bolton (1995: 240) published "A New General Catalogue of the Ants of the World", the type material from the Forel Collection was missing. The catalogue entry reads: "*Atopula jacobsoni* Forel, 1915a: 25 (w.) SUMATRA. Combination in *Leptothorax*: Forel, 1916: 458 (in text); in *L. (Goniothorax)*: Emery, 1922f: 250. [Note. This may be a *Vombisidris* species; holotype is currently missing from Forel Collection.]". Eight years later, Bolton (2003: 272) finally transferred the species into *Vombisidris*, saying after his discussion of *Nesomyrmex*: "Taxon excluded from the above *jacobsoni*, which from the original description is probably a *Vombisidris* species (holotype is missing; see Bolton, 1995b: 240). Combination of this is provisionally *Vombisidris jacobsoni* (Forel) comb. n.".

When Bernhard Merz (Muséum d'Histoire Naturelle, Genève) informed me that the specimens were returned to the Forel Collection and available for loan, I decided to borrow them and investigate their cryptic identity. Having examined the missing specimens I can now confirm Bolton's suspicion – there is no doubt this species belongs in *Vombisidris*. I can also resolve the whereabouts of the type specimens.

Quite surprisingly, I found a label with the correct combination already on the pin while examining the labels of the specimens in the Forel Collection – "*Vombisidris jacobsoni* (FOREL), Det: 1995 A. Francoeur". I immediately contacted Prof. André Francoeur (University of Québec at Chicoutimi) who provided extracts from the notes he had made on the Forel collection. Thanks to Prof. Francoeur's kind cooperation, I ascertained that in 1995 Prof. Francoeur found the specimens in the collection under *Goniothorax* and concluded that they neither belong to *Leptothorax* nor *Nesomyrmex* and labelled them as "*Vombisidris jacobsoni*" at a later stage of his research

(Francoeur, in litt.). So it seems that, while Prof. André Francoeur was studying borrowed specimens from the Forel Collection, Barry Bolton was working on "A New General Catalogue of the Ants of the World" (1995) and therefore, could not find the missing type specimens in the Forel Collection.

MATERIAL AND METHODS

The specimens are dry mounted on card squares. Examination of all three specimens was carried out with an Olympus SZH10 Research Stereo binocular microscope; measurements were taken at magnifications of 25× and 70×. Digital photographs were taken with a Leica DFC490 camera attached to a Leica MZ16 binocular microscope with the help of Image Manager IM50 and processed with the software Helicon Focus 4.80 and Adobe Photoshop 7.0.

Terminology and method of description largely follow Bolton (1991), most measurements and indices follow Bolton (1983) (as done by Bolton, 1991). All measurements are in millimetres.

Measurements and indices (* after Bolton, 1983):

- TL* Total Length. Total outstretched length of ant from mandibular apex to gastral apex.
- HL* Head Length. Length of head proper, excluding mandibles, measured in full face view from mid-point of anterior clypeal convexity to mid-point of occipital margin.
- HW* Head Width. Maximum width of head, in full-face view measured behind eyes (excluding eyes).
- CI* Cephalic Index. HW/HL × 100
- EL Eye length. Length of maximum eye diameter in lateral aspect of head.
- EI Eye Index. EL/HW × 100
- SL* Scape Length. Maximum straight line length of antennal scape excluding basal constriction or neck close to condylar bulb.
- SI* Scape index. SL/HW × 100
- PW* Pronotal Width. Maximum width of pronotum in dorsal view.
- AL* Alitrunk Length. Diagonal length of alitrunk in profile, from the point at which the pronotum meets the cervical shield to posterior base of metapleuron.
- FL Hind femur Length. Maximum length of metafemur.
- FI Hind femur Index. FL/HW × 100

SYSTEMATIC PART

Vombisidris jacobsoni (Forel, 1915) Figs 1-5

Type material: 1 lectotype worker (upper specimen), 1 paralectotype worker (lower specimen) labelled "Type", "*Atopula*\ *Jacobsoni*\ ☿ Type For.", "27\ No 15\ Sinabang\ (Simalur\ Sumatra\ I 1913\ (E. Jacobson)" [= leg. Edw. Jacobson], "sp. *A. Jacobsoni* For.", "Vombisidris\ jacobsoni\ (FOREL)\[on backside:] Det: 1995\ A. Francoeur", "LECTOTYPE\ *Atopula jacobsoni*\ Forel, 1915\ des. D.M. Sorger 2010", "PARALECTOTYPE\ *Atopula jacobsoni*\ Forel, 1915\ D.M. Sorger 2010", "*Vombisidris*\ *jacobsoni* (Forel)\ det. D.M. Sorger 2010", specimens glued on two squared card boards on the same pin, in coll. Forel at MHNG (Muséum d'Histoire Naturelle, Genève), Switzerland. – 1 paralectoype worker labelled "Cotypus", "*Atopula*\ *Jacobsoni*\ ☿ Type For.\ Simalur", "SYNTYPUS\ Atopula\ Jacobsoni\ A. Forel, 1915", "MUSEO GENOVA\ coll. C. Emery\ dono 1925", "PARALECTOTYPE\ *Atopula jacobsoni*\



Fig 1

Vombisidris jacobsoni, lectotype worker from Sumatra, Simalur, in the Forel Collection of the Muséum d'Histoire Naturelle, Genève. Habitus, dorsal view. © www.antbase.net, published with permission.

Forel, 1915\ D.M. Sorger 2010", "*Vombisidris*\ *jacobsoni* (Forel)\ det. D.M. Sorger 2010", glued on a squared card board, in coll. Emery at Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy.

Type locality: Indonesia, Sumatra, Simalur Island (alternative spelling: Simeulue), Sinabang (capital city) (2° 29′ 0″ N, 96° 22′ 30″ E, Google Earth)

Description of worker: A species of the genus *Vombisidris* as defined by Bolton (1991), with the following characters.

Colour of entire body light brown to yellow (two type specimens almost entirely light brown, one type specimen almost entirely yellow). Femora and tibiae lighter than rest of body (whitish yellow except for infuscated bases) (figs 1, 2, 3).

Entire body with short thick, blunt (abruptly truncated apically) setae (some setae on postpetiole even slightly clavate); distinctly shorter setae on head (fig. 3), longer and finer setae on scapes (fig. 4). In addition, some fine, short scattered appressed hairs on gaster.

Head, dorsum of mesosoma, petiole and postpetiole with distinct rugoreticulum. Spaces between costulae mostly smooth and shiny. Pronotum angulate, cervical shield with a few longitudinal ridges overlaying granulate microsculpture (figs 1, 2). Sides of mesosoma with some rugae overlaying microsculpture (fig. 3). Dorsum of petiolar peduncle with very finely reticulate sculpture. Gaster slightly depressed in lateral aspect, smooth and shiny, some short striae at base of tergite 1 (figs 1, 2, 3).







Figs 2-5

Vombisidris jacobsoni, paralectotype worker from Sumatra, Simalur in the Forel Collection of the Muséum d'Histoire Naturelle, Genève. (2) Habitus, dorsal view. (3) Habitus, lateral view. (4) Head, full face view. (5) Labels of lectotype and paralectoype workers (on one pin). © www.antbase.net, published with permission.

Head slightly longer than wide, sides behind eyes feebly convergent (fig. 4). Eyes protruding and relatively large (EI 24, 25) containing 8-10 ommatidia in longest row. Clypeus strongly convex in lateral aspect (fig. 3), in full face view its anterior margin covered by its convexity (fig. 4). Subocular groove complete, from mandibular insertion backwards to latero-occipital margin. Mandibles smooth with some fine short hairs, hair pits indistinct (fig. 4). Dorsal and lateral faces of mesosoma forming an angle, mesosoma broadest at outer pronotal angles, continuously becoming narrower towards propodeum in dorsal aspect (maximum pronotum width ca. twice maximum propodeum width), sides feebly concave (figs 1, 2), dorsum evenly convex in lateral aspect, metanotal groove absent (fig. 3). Propodeum in dorsal aspect slender (figs 1, 2); spiracle situated below level of spines (fig. 3). Propodeal spines long, slightly down-curved in lateral aspect (fig. 3), curved inwards in dorsal aspect (figs 1, 2). Petiole (figs 1, 2, 3) with long peduncle bearing a pair of teeth in front of spiracle; anterior and dorsal face of node separated by a transverse ridge forming a blunt angle in lateral aspect, ventrally with anterolateral small teeth. Postpetiole in dorsal aspect (figs 1, 2) subtrapezoidal, widest anteriorly. Legs relatively short (FL < HW), femora and tibiae conspicuously thickened (figs 1, 2, 3).

Measurements: Lectotype worker (coll. Forel): TL 3.8; HL 0.86; HW 0.81; CI 95; EL 0.20; EI 25; SL 0.60; SI 74; PW 0.59; AL 1.20; FL 0.79; FI 97; paralectotype worker 1 (coll. Forel): TL 2.8; HL 0.81; HW 0.73; CI 90; EL 0.17; EI 24; SL 0.54; SI 75; PW 0.51; AL 1.09; FL 0.70; FI 96; paralectotype worker 2 (coll. Emery): TL 3.7; HL 0.83; HW 0.80; CI 97; EL 0.20; EI 25; SL 0.60; SI 75; PW 0.60; AL 1.10; FL 0.79; FI 98.

Notes: In Bolton's (1991) key *V. jacobsoni* reaches couplet 3 where a short metafemur contradicts the absence of a metanotal groove. Following Bolton's (1991: 5) species-group descriptions, *V. jacobsoni* belongs to the *V. australis* group: "*V. australis*-group. Subocular groove complete. Legs and antennae relatively short. Metanotal groove vestigial to absent. A convenience-group to hold species not fitting any of the above groups [Other species groups in *Vombisidris* are: *V. bilongrudi*-group, *V. philax*-group and *V. dryas*-group, see Bolton (1991).]. Includes *australis*, *harpeza*, *occidua*.".

Vombisidris australis (Wheeler, 1934) differs from *V. jacobsoni* in size (smaller), presence of mesonotal suture (although indistinct) and shape and length of propodeal spines (shorter, blunt); *V. harpeza* Bolton, 1991 differs from it in head shape (sides behind eyes approximately parallel) and presence of metanotal groove (although almost obliterated); and *V. occidua* Bolton, 1991 differs in size (larger), occurrence of basigastral costulae (vestigial) and colour (head and mesosoma dark brown, gaster lighter brown, legs yellow) (see Wheeler, 1934; Bolton, 1991).

In Forel's (1915: 27) original description of *V. jacobsoni*, he mentions the smallest specimen to be paler than the rest and wonders about its maturity. Even though, it is impossible to know whether I have seen all specimens Forel based his original description on (since he does not mention the total number of specimens studied), I believe the aforementioned specimen to be the one I examined and photographed as the paralectoype in the Forel Collection (figs 2-4). Total Length of specimen deviates from Forel's original description – probably due to differences between my measurement technique and that of Forel.

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Note sur la systématique de quelques espèces du genre *Prosymna* Gray, 1849 en Afrique au Nord de l'équateur (Serpentes, Prosymnidae)

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Note sur la systématique de quelques espèces du genre *Prosymna* Gray, 1849 en Afrique au Nord de l'équateur (Serpentes, Prosymnidae). - Les importantes variations de coloration et d'écaillure chez *Prosymna meleagris* ont conduit à la description de nouveaux taxons, qui ont ensuite été placés en synonymie. Des collectes intensives réalisées au Cameroun nous ont permis de mettre en évidence une corrélation entre ces variations et leur répartition géographique. Nous avons rassemblé le matériel disponible dans les musées et les nombreuses collectes nouvelles que nous avons effectuées en Afrique occidentale et centrale pour mener parallèlement une analyse de la coloration, de l'écaillure et une analyse ADN. Nous montrons ainsi l'existence, dans trois types de milieux clairement différenciés, de trois taxons distincts: deux de rang spécifique, un de rang subspécifique.

Mots-clés: *Prosymna meleagris* - *Prosymna greigerti* - Prosymnidae - Afrique - savane.

Summary: Important coloration and scalation variations in *Prosymna meleagris* made herpetologists describe some new taxa, which were later synonymised. Intensive collections and field observations in Cameroon allowed us to reveal a correlation between these variations and geographic repartition. We examined museum material together with our numerous new collects from West and Central Africa: coloration, morphometric, scalation, and molecular data were collected to compare their variations. This study allowed us to show the existence of three distinct taxa, which occupy three different biotopes : two with specific rank and one with subspecific rank.

Keywords: *Prosymna meleagris* - *Prosymna greigerti* - Prosymnidae - Africa - savanna.

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INTRODUCTION

Les serpents du genre *Prosymna* Gray, 1849 forment un groupe remarquablement homogène, aux affinités encore obscures. Nocturnes et fouisseurs, ils sont ovipares et semblent se nourrir essentiellement des œufs d'autres reptiles. De récentes analyses phylogénétiques les ont d'abord situés au sein des Colubridae parmi les Colubrinae (Cadle, 1994), ou alors à proximité des Pseudoxyrhophiinae (Nagy *et al.*, 2005). Plus récemment, Kelly *et al.* (2009) ont montré que ce genre, qui ne présente de liens clairs avec aucun autre groupe parmi les Elapoidea, doit être placé dans une famille particulière, celle des Prosymnidae.

La systématique du genre a fait l'objet de plusieurs études (Chabanaud, 1916; Loveridge, 1958; FitzSimons, 1959) dont la dernière et la plus complète est celle de Broadley (1980). Ce dernier auteur, après avoir examiné près de 900 spécimens provenant de toute l'Afrique subsaharienne, reconnaît alors dans le genre 18 taxons répartis en 14 espèces (Broadley 1980, 1992, 1995). Il distingue une seule espèce en Afrique de l'Ouest, *P. meleagris* (Reinhardt, 1843) qui se différencie des autres espèces du genre par la combinaison des caractères suivants: une seule internasale (sauf cas exceptionnel), 5 supralabiales, écailles dorsales lisses portant 2 fossettes apicales, 136-165 ventrales chez les ♂♂, 153-187 chez les ♀♀.

Broadley (1980) distingue deux sous-espèces au sein de *P. meleagris*, qu'il différencie essentiellement par leurs décomptes de ventrales:

- *P. meleagris meleagris* (Reinhardt, 1843): 136-150 ventrales chez les ♂♂, 153-168 chez les ♀♀;
- *P. meleagris greigerti* Mocquard, 1906: 149-165 ventrales chez les ♂♂, 166-187 chez les ♀♀.

Il reconnaît enfin un troisième groupe d'individus, qu'il considère comme intermédiaires entre les 2 sous-espèces («*P. m. meleagris* ↔ *P. m. greigerti*»), avec les décomptes de ventrales suivants: 145-153 ventrales chez les ♂♂, 162-172 chez les ♀♀. Il note que certains des spécimens de ce groupe intermédiaire présentent le patron de coloration décrit par Sternfeld (1908) dans sa description de *P. collaris*: «*this consists on a U-shaped white marking bordering the parietals (this may be broken mesially or reduced to a pair of white postparietal blotches), then a broad black cross-band on the neck, followed by a narrow white crossband. The black crossband usually continues across the throat in the form of about nine brown ventrals*». D'autres spécimens de ce troisième groupe ont la coloration typique de *P. m. greigerti*; Broadley place donc *P. collaris* en synonymie de *P. m. greigerti*, en précisant que «*until more material is available from northern Togo, the syntypes of variety* collaris *are best regarded as* P. m. meleagris ↔ P. m. greigerti *intergrades*».

Au cours de nombreuses recherches de terrain en Afrique centrale de 1990 à 2001, puis en Afrique de l'Ouest de 2004 à 2010, l'un de nous (L. Chirio) a récolté 45 nouveaux spécimens du groupe *Prosymna meleagris s.l.*, qui sont ou qui seront tous déposés dans les collections du Muséum national d'Histoire naturelle de Paris: la mise en évidence d'une relation étroite entre le patron de coloration des individus et leur origine géographique (Chirio & Ineich, 2006; Chirio & LeBreton, 2007) nous a

conduits à entreprendre un examen approfondi pour comparer les spécimens de *Prosymna meleagris s.l.* disponibles dans les principales collections muséologiques européennes et africaines, ce qui constitue l'objet de la présente publication.

MATÉRIEL ET MÉTHODES

Au cours de ce travail nous avons examiné 349 spécimens, provenant de toute l'aire de répartition de *Prosymna meleagris s.l.*; ces spécimens sont déposés dans les collections des établissements suivants: British Museum de Londres, Royaume-Uni (BMNH), Centre National de la Recherche Scientifique et Technologique de Ouagadougou, Burkina-Faso (HV), Muséum national d'Histoire naturelle de Paris, France (MNHN), Musée Royal de l'Afrique Centrale de Tervuren, Belgique (MRAC), Zoologisches Museum der Universität von Berlin, Allemagne (ZMB), Zoologisk Museum, Copenhagen, Denmark (ZMUC); de nombreux spécimens des collections particulières de L. Chirio et de J.-F. Trape ont également été examinés (ceux-ci seront déposés ultérieurement au MNHN).

Les caractères étudiés ont été essentiellement ceux proposés par Broadley (1980); cependant, nous en avons éliminé 4 qui ne concernaient que des espèces bien particulières du genre *Prosymna*: la forme de la rostrale et le contact préfrontale/1ère supralabiale, qui permettent de distinguer *P. visseri* de toutes les autres espèces du genre; le nombre d'infralabiales (8 en général dans le genre), qui permet de distinguer *P. frontalis* (9 en moyenne) et *P. visseri* (7 en moyenne); la présence de carènes dorsales, spécifique de *P. janii*.

Nous avons également éliminé quatre caractères délicats à appréhender pour une distinction facile des taxons: la dentition, difficile à observer à cause de la petite taille des individus; la distance cœur/foie, qui nécessite la dissection de l'animal; la forme des hémipénis, difficile à observer sur des spécimens naturalisés; le caryotype, qui nécessite des spécimens vivants et le recours à un cytogénéticien.

Les caractères retenus pour notre étude ont donc été les suivants: coloration; nombre d'internasales; nombre de postoculaires; formule temporale; nombre de supralabiales; nombre de fossettes apicales sur les écailles du dos; nombre de fossettes apicales sur les écailles de la queue; nombre de rangs d'écailles dorsales; niveau de réduction des rangs de dorsales de 17 à 15; nombre de ventrales; nombre de sous-caudales.

Enfin, nous avons ajouté à cette liste deux nouveaux caractères: le nombre de préoculaires, et le rapport longueur du corps/longueur de la queue.

Pour estimer le degré de divergence des séquences d'ADN entre les différentes formes de coloration du complexe *P. meleagris s.l.*, l'un d'entre nous (A. Schmitz) a utilisé des échantillons de tissus des trois formes *meleagris* (2), *greigerti* (1) et *collaris* (1) (JF340122 - JF340125). L'analyse a porté sur un fragment de 550 paires de bases (incluant d'éventuelles délétions) du gène mitochondrial de l'ARNr 16S. Nous avons ajouté comme témoin pour notre analyse la séquence homologue d'un membre de l'espèce congénérique sud-africaine *Prosymna visseri* (GenBank AY188072). Les méthodes ont été celles utilisées par Schmitz *et al.* (2005) et Chirio *et al.* (2008). Les séquences ont été alignées en utilisant le logiciel ClustalX (Thompson *et al.*, 1997; paramètres par défaut) et traitées manuellement en utilisant les données de chromato -

graphie originales du programme BioEdit (Hall, 1999). Nous avons utilisé BioEdit et PAUP* 1.0b10 (Swofford, 2002) pour corriger les distances entre toutes les séquences étudiées.

RÉSULTATS

L'examen des 349 spécimens du complexe d'espèces *Prosymna meleagris* disponibles dans les collections étudiées a permis de distinguer trois grands groupes d'après la coloration: grossièrement, le premier groupe (forme *meleagris* sensu stricto) est caractérisé par une coloration uniforme, roussâtre pointillée de blanc sur le dos et blanchâtre sur le ventre (Fig. 1); le deuxième groupe (forme *greigerti*) est caractérisé par une coloration uniforme grisâtre pointillée de blanc sur le dos, la face ventrale blanchâtre présentant un large collier gulaire sombre (Fig. 2); enfin, le troisième groupe (forme *collaris*) est caractérisé par la présence d'une large selle noire entourée de 2 colliers blancs sur la nuque, suivie d'une coloration dorsale grisâtre pointillée de blanc et, sur la face ventrale, d'un collier gulaire sombre contrastant avec un ventre blanc (Fig. 3).

L'analyse des caractères d'écaillure retenus n'a montré aucune variation importante pour les neuf caractères suivants:

- nombre d'internasales: toujours une, sauf 2 chez le type de *P. m. greigerti*;
- nombre de préoculaires: 1, très rarement 2;
- nombre de postoculaires: 1, très rarement 2;
- formule temporale: 1+2 (très rarement 1+1, 2+2 ou 2+3);
- nombre de supralabiales: toujours 5;
- nombre de fossettes apicales sur les écailles du dos: toujours 2;
- nombre de fossettes apicales sur les écailles de la queue: 2, rarement 3 ou 4;
- nombre de rangs d'écailles dorsales: toujours 17;
- réduction des rangs de dorsales: 17 (rarement 19) au niveau de la dixième ventrale, 15 au niveau de la centième ventrale, 13 (rarement 14) au niveau de la plaque anale.

On n'observe donc de variations importantes que pour les trois caractères suivants:

• **nombre de ventrales:** il varie entre 132 et 190, avec un fort dimorphisme sexuel: d'une façon générale, le nombre de ventrales est plus élevé chez les femelles que chez les mâles. On dénombre:

- 132 à 167 ventrales chez la forme *meleagris*, avec 132 à 147 ventrales chez les ♂♂ (m = 140,3 ±6,45; n=16) et 147 à 167 chez les ♀♀ (m = 157,4 ±6,91; n=19);
- 144 à 190 ventrales chez la forme *greigerti*, avec 144 à 159 ventrales chez les ♂♂ (m = 152 ±5,3; n=38) et 159 à 190 chez les ♀♀ (m = 172 ±6,72; n=57);
- 147 à 188 ventrales chez la forme *collaris*, avec 147 à 164 ventrales chez les ♂♂ (m = 154 ±4,65; n=32) et 168 à 188 chez les ♀♀ (m = 174,1 ±5,94; n=37).

• **nombre de sous-caudales:** il varie entre 17 et 41, avec un fort dimorphisme sexuel: d'une façon générale, le nombre de sous-caudales est plus élevé chez les mâles que chez les femelles. On dénombre:

- 17 à 36 sous-caudales chez la forme *meleagris*, avec 27 à 36 sous-caudales chez les ♂♂ (m = 31,5 ±2,42; n=16) et 17 à 23 chez les ♀♀ (m = 20,7 ±1,13; n=19);
- 19 à 41 sous-caudales chez la forme *greigerti*, avec 28 à 41 sous-caudales chez les ♂♂ (m = 34,6 ±2,28; n=38) et 19 à 26 chez les ♀♀ (m = 22,7 ±2,52; n=57);
- 20 à 37 sous-caudales chez la forme *collaris*, avec 30 à 37 sous-caudales chez les ♂♂ (m = 34 ±1,9; n=32) et 20 à 26 chez les ♀♀ (m = 23,5 ±1,54; n=37).

• **rapport longueur du corps/longueur de la queue:** il varie entre 4,05 et 16,47, avec un fort dimorphisme sexuel: d'une façon générale, ce rapport est plus faible chez les mâles que chez les femelles. Il varie entre:

- 5,28 et 13,12 chez la forme *meleagris*, avec 5,28 à 7,25 chez les ♂♂ (m = 6,00 ±0,56; n=16) et 8,38 à 13,12 chez les ♀♀ (m = 11,12 ±1,32; n=19);
- 4,86 et 16,47 chez la forme *greigerti*, avec 4,86 à 7,82 chez les ♂♂ (m = 6,02 ±0,56; n=38) et 8,58 à 16,47 chez les ♀♀ (m = 11,35 ±1,28; n=57);
- 4,05 et 12,78 chez la forme *collaris*, avec 4,05 à 7,87 chez les ♂♂ (m = 6,13 ±1,11; n=32) et 9,28 à 12,78 chez les ♀♀ (m = 11,11 ±0,86; n=37).

On constate que, pour les individus d'un même sexe, la forme *meleagris* se distingue des formes *greigerti* et *collaris* par un nombre de ventrales et de sous-caudales en moyenne plus faible. Les deux formes *greigerti* et *collaris*, par contre, ne peuvent pas être clairement distinguées par des caractères d'écaillure. Le rapport longueur du corps/longueur de la queue ne permet pas de distinguer clairement les trois formes étudiées.

En ce qui concerne l'analyse génétique, alors que les séquences obtenues avec les deux individus du groupe *meleagris* se sont révélées totalement identiques, on constate de très nettes différences entre ce groupe et les deux autres formes, avec les pourcentages de différences suivants: 3,7% entre les formes *meleagris* et *greigerti*, 3,5% entre les formes *meleagris* et *collaris*, 1,3% entre les formes *greigerti* et *collaris*. La comparaison des 3 formes du complexe *meleagris s. l.* avec l'espèce sud-africaine *P. visseri* a donné les pourcentages de différences suivants: 8,6% pour la forme *meleagris*, 8,8% pour la forme *greigerti* et 9% pour la forme *collaris*.

Les distances génétiques mises en évidence à l'intérieur du complexe *P. meleagris s. l.* sont significatives et démontrent clairement que les trois formes de coloration correspondent à trois taxons distincts. Les valeurs obtenues concordent avec les résultats obtenus chez d'autres espèces de reptiles d'Afrique occidentale et centrale (Mausfeld *et al.*, 2004; Schmitz *et al.*, 2005; Chirio *et al.*, 2008). Les distances génétiques mises en évidence entre ces trois taxons sont cependant plus faibles que celles qui les séparent de l'espèce sud-africaine congénérique *P. visseri*: cela prouve que les

trois formes attribuées à l'espèce *P. meleagris s. l.* sur la base de caractères morphologiques et de leur répartition (Broadley, 1980) sont des taxons étroitement apparentés, et descendent probablement d'un ancêtre commun direct. Avec 3,6% de différences en moyenne, *P. meleagris* et *P. greigerti* doivent être considérées comme deux espèces à part entière. La distance génétique séparant la forme *collaris* de la forme *greigerti* étant inférieure à la moitié de celle qui sépare la forme *meleagris* des deux autres, il semble préférable de considérer la forme *collaris* comme une sous-espèce de *P. greigerti*. Ce découpage taxonomique apparaît dans les deux ouvrages les plus récents (Trape & Mané, 2006; Chirio & LeBreton, 2007), inspiré par les premiers résultats non publiés de la présente étude.

INVENTAIRE SYSTÉMATIQUE

Prosymna meleagris (Reinhardt, 1843) Fig. 1

Calamaria meleagris Reinhardt, 1843: 238.
Temnorhynchus meleagris Peters, 1875: 198.
Prosymna meleagris meleagris Loveridge, 1958: 145.

Matériel examiné

Sénégal: Bandia (Coll. Trape 0352S, 0393S). – Bignona (MNHN 1962.0558). – Boughari, Casamance (BMNH 1968.1227-30). – Dakar (Coll. Trape 3418S). – Dielmo (Coll. Trape 3418S). – Djibonker (Coll. Trape 3418S). – Keur Bakar Mané (Coll. Trape 0451S). – Keur Gadji (Coll. Trape 1022S). – Keur Seny Gueye (Coll. Trape 2270S). – Mahamouda Chérif (Coll. Trape 6527S, 7082S, 7341S, 8227S). – Mbao (Coll. Trape 0145S). – Niakhar (Coll. Trape 6036S). – Tabi, près de Bignona (MNHN 1962.0558). – Yene (Coll. Trape 7630S).

Guinée : Mt Kakoulima, 50 Km au Nord de Conakry (MNHN 1962.0344). – Foulaya (Coll. Trape 0178G). – Kalékouré (Coll. Trape 0705G, 0715-16G). – Kilissi (Coll. Trape 0075G, 0082G, 0360G, 0403G, 0407G, 0410-11G). – Kindia (Coll. Trape 0036G, 2664-65G). – Lanta (Coll. Trape 0097B, 0102B). – Tembaya (Coll. Trape 0057G).

Côte D'ivoire: Nord de Bouaké (MNHN 1987.1777-78). – Lamto (MNHN 1977.0380-82; MNHN 1995.9414; MNHN 2001.0630). – Ouassou Baoulé (MNHN 8514); route de Dabakala à Toumodi (MNHN 1908.0062).

Ghana: sans localité précise [lectotype] (ZMUC/R 601018).

Togo: Fazao (Coll. Trape 0117-22T). – Lac Togo (MNHN 1989.0272). – Sodo-Zion (Coll. Trape 0078T).

Bénin: Agouagou, 150 Km de Porto-Novo (MNHN 1916.0175-76).

Nigeria: Keana (BMNH 1927.11.19.7). – Bodagri, Lagos (BMNH 1913.7.21.1-2. – BMNH 89.12.16.109). – Makurdi (BMNH 137.12.4.45). – Mutum Biu (BMNH 1916.11.6.11).

Cameroun: Nseh, Sud de Furu-Awa (Coll. Chirio 4542X).

Type et localité type: ZMUC/R 60618, lectotype décrit en 1843 par Reinhardt comme *Calamaria meleagris*, étiqueté «Guinée» = côte du Ghana (Hughes & Barry, 1969).

Identification: coloration du dos uniforme de la nuque à la queue: chaque écaille dorsale, brun roussâtre, présente une tache apicale blanche; toutes les ventrales présentent un centre blanc; 132-147 ventrales chez les ♂♂, 147-167 chez les ♀♀.

Ecaillure: rostrale avec le bord saillant, concave sur sa face inférieure, la portion visible dorsalement mesurant environ la moitié de la longueur de la préfrontale; frontale plus longue que sa distance à l'extrémité du museau; loréale nettement plus longue que large; 1 préoculaire (très rarement 2); 1 postoculaire (très rarement 2); temporales 1+2 (très rarement 1+1, 2+2 ou 2+3); 5 supralabiales, les 2ème et 3ème en



FIG. 1
Prosymna meleagris, coll. Chirio 4542X (Nseh, Cameroun - 25/07/2001) - Photo M. LeBreton

contact avec l'orbite; 8 infralabiales (rarement 7 ou 9), les 3 premières en contact avec les sublinguales; écailles dorsales lisses, portant 2 fossettes apicales, 2 à 4 fossettes sur les supra-caudales; 132-147 ventrales chez les ♂♂ (m = 140,3 ±6,45; n=16), 147-167 chez les ♀♀ (m = 157,4 ±6,91; n=19); 27-36 sous-caudales paires chez les ♂♂ (m = 31,5 ±2,42; n=16), 17-23 chez les ♀♀ (m = 20,7 ±1,13; n=19); rapport LC/LQ compris entre 5,28 et 7,25 chez les ♂♂ (m = 6,00 ±0,56; n=16), entre 8,38 et 13,12 chez les ♀♀ (m = 11,12 ±1,32; n=19).

COLORATION: dessus de la tête uniformément brun roussâtre, y compris le dessous de la rostrale; la partie supérieure des labiales supérieures est également brun roussâtre, la partie inférieure blanche; chaque écaille dorsale (y compris celles de la nuque) présente la même coloration générale brun roussâtre avec une tache apicale blanche, plus grande sur les rangs latéro-dorsaux que sur les rangs médio-dorsaux (Fig.1); la coloration brun roussâtre déborde sur le bord latéral antérieur de chaque plaque ventrale, mais le centre de chaque ventrale est blanc; pas de collier gulaire sombre. Il n'y a pas de dimorphisme sexuel apparent dans la coloration.

TAILLE: le plus grand mâle examiné (BMNH 89.12.16.109 de Lagos, Nigeria) mesure 272 mm de longueur totale (LC = 232 mm + LQ = 40 mm); la plus grande femelle (BMNH 1913.7.21.1 de Budagri près de Lagos, Nigeria) mesure 321 mm de longueur totale (LC = 293 mm + LQ = 28 mm).

HABITAT: savanes guinéennes, mosaïque savane-forêt; ce taxon occupe les biotopes les plus humides.

DISTRIBUTION: nous avons utilisé les données fournies par Broadley (1980), augmentées de nos données personnelles. La répartition de cette espèce couvre les pays suivants: Ouest du Sénégal, Guinée, Sierra Leone, Liberia, Côte d'Ivoire, Ghana, Togo, Bénin, Nigeria, extrême Sud-Ouest du Cameroun; à l'Est de la chaîne volcanique du Cameroun elle est remplacée par la forme vicariante *P. ambigua bocagii*.

Prosymna greigerti greigerti Mocquard, 1906 Fig. 2

Prosymna greigerti Mocquard, 1906: 466
Prosymna meleagris laurenti Loveridge, 1958: 141

MATÉRIEL EXAMINÉ

Sénégal: Bamako Samba (Coll. Trape 7994S). – Bandafassi (Coll. Trape 1996S, 2610S, 2614S, 2621S, 2633S, 4821-22S, 4824S, 4827-29S, 4835S, 4840S, 4844-45S). – Boundoukondi (Coll. Trape 5750S). – Dabo (Coll. Trape 3871S, 3892S). – Ebarakh (Coll. Trape 4956S, 4969S, 4975S, 4984S). – Fafakourou (Coll. Trape 6629S, 6634S, 6948S, 6968-69S, 7515S, 7519S). – Gamon (Coll. Trape 4602S, 4604S). – Guénoto (Coll. Trape 4745S, 5188S). – Ibel (Coll. Trape 1787S, 2908S, 2937S, 3010S, 3042S, 3052S, 3088S, 3106S, 3108S, 3123S, 3155S, 3171S, 3174S, 4269S, 4847S, 4850S, 4852S, 4857-59S, 4869S, 5746S, 7094S, 7106S, 7108S, 7691-92S, 7745S). – Keur Bakar Mané (Coll. Trape 2316S). – Koumbacara (Coll. Trape 4693S). – Landieni (Coll. Trape 1903S, 1923S, 2412S, 2444S, 2446-47S). – Mamakono (Coll. Trape 4519S, 4569S). – Marewé (Coll. Trape 7474S). – Nathia (Coll. Trape 2657S, 2755S, 2818S, 2829S, 2862S, 2866S). – Ndébou (Coll. Trape 1850S, 3208-09S, 3218S, 3222S, 3240S, 3276S). – Sambarabougou (Coll. Trape 4426S, 4443S, 4453S). – Takoudialla (Coll. Trape 4774S, 6660S, 6918S, 7480S, 7491S, 7496-98S, 7502S). – Tialé (Coll. Trape 4811S).

Gambie: McCarthy Island (Andersson 1937).

Mali: Bamako (MNHN 8807). – Bangaya (Coll. Trape 0289M). – Djinagué (Coll. Trape 1209M). – Kati (MNHN 1921.0591-92). – Koundian (Coll. Trape 2372M). – Laminia (Coll. Trape 0741M, 0747M, 0752M, 0756M, 0823M, 0854M). – Mamoroubougou (Coll. Trape 1928M, 1933M, 1938M, 3712M, 3719M, 3737M, 3753M, 3805M, 3832M, 3835M, 3851M). – Niamou (Coll. Trape 1922M). – Npiebougou (Coll. Trape 3323M, 3435M, 3461M, 3471M, 3481M). – San (MNHN 1932.0162). – Sebekourani (Coll. Trape 0149M, 0152M, 0967M, 0980-81M, 0992M, 3261M, 3261M, 3269M). – Titiena (Coll. Trape 1925-27M, 1929M, 1931M). – Toumboula (Coll. Trape 1235M). – Zamoko (Coll. Trape 0154M, 1919M).

Guinée: Dar es Salam (Coll. Trape 3568G). – Kouara (Coll. Trape 0119-20G). – Pont Gambie (Coll. Trape 0894G, 0896-98G, 3507G, 3526G, 3529G, 3917G, 3942G, 3945-46G). – Tabakourou (Coll. Trape 2441G, 2447G, 2452G, 2591G).

Burkina-Faso: Boromo, 250 Km à l'Ouest de Ouagadougou (MNHN 1908.0169) . – Pays Lobi [type] (MNHN 1906.0154). – Sindou (HV 2112).

Togo: Aledjo (Coll. Trape 0188T, 0202T).

Nigeria: Jos (BMNH 1963.25).

Cameroun: Boubandjida (MNHN 2003.2919). – Magoumaz (MNHN 2003.2918). – Ngaouyanga (MNHN 2002.0979), 5 Km au Sud de Poli (MNHN 2003.2930).

République Centrafricaine: Am-Dafok (MNHN 1996.6822). – Bossangoa (MNHN 1994.8219-20). – Kouki (MNHN 1994.8221-33, MNHN 1995.3571-81). – La Gounda (MNHN 1992.4611).

République Démocratique Du Congo: Kunungu (MRAC 5676).

Soudan: Boma (MNHN 2001.0183). – Singa (BMNH 1908.5.19.10).

Ethiopie: Didessa River, Woolega Province (BMNH 1973.3254).

TYPE ET LOCALITÉ-TYPE: type MNHN 1906.0154 décrit par Mocquard en 1906 de la région Lobi, Haute-Volta (= Burkina-Faso).



FIG. 2
Prosymna g. greigerti, coll. Trape 4827S (Bandafassi, Sénégal - 06/10/2000) - Photo J.-F. Trape

IDENTIFICATION: coloration du dos uniforme de la nuque à la queue: chaque écaille dorsale, gris sombre, présente une tache apicale blanche; les premières ventrales, entièrement colorées de gris, forment un collier gulaire sombre; 144-159 ventrales chez les ♂♂, 159-190 chez les ♀♀.

ECAILLURE: rostrale avec le bord saillant, concave sur sa face inférieure, la portion visible dorsalement mesurant environ la moitié de la longueur de la préfrontale (la préfrontale n'est divisée que chez le type de *P. greigerti*); frontale plus longue que sa distance à l'extrémité du museau; loréale nettement plus longue que large; 1 préoculaire; 1 postoculaire (fusionnée avec la 3ème supralabiale dans un seul cas); temporales 1+2 (très rarement 2+2); 5 supralabiales, les 2ème et 3ème en contact avec l'orbite; 8 infralabiales (rarement 7), les 3 premières en contact avec les sublinguales; écailles dorsales lisses, portant 2 fossettes apicales, 2 ou 3 fossettes peu visibles sur les supracaudales; 144-159 ventrales chez les ♂♂ (m = 152 ±5,3; n=38), 159-190 chez les ♀♀ (m = 172 ±6,72; n=57); 28-41 sous-caudales paires chez les ♂♂ (m = 34,6 ±2,28; n=38), 19-26 chez les ♀♀ (m = 22,7 ±2,52; n=57); rapport LC/LQ compris entre 4,86 et 7,82 chez les ♂♂ (m = 6,02 ±0,56; n=38), entre 8,58 et 16,47 chez les ♀♀ (m = 11,35 ±1,28; n=57).

COLORATION: dessus de la tête uniformément gris sombre; la portion dorsale des labiales supérieures est également gris sombre, la portion inférieure blanche; chaque écaille dorsale (y compris sur la nuque) présente la même coloration générale gris sombre, avec une tache apicale blanche (Fig. 2); les 15 premières ventrales environ sont tachées de gris sombre, ce qui forme un collier gulaire sombre bien visible, surtout chez les spécimens de l'Est de l'aire de répartition (du Cameroun à l'Ethiopie); en arrière, la coloration gris sombre déborde sur le bord latéral antérieur de chaque ventrale, avec parfois quelques taches sombres isolées, mais le centre de la plaque est blanc. Il n'y a pas de dimorphisme sexuel apparent dans la coloration.

TAILLE: le plus grand mâle examiné (MNHN 1995.3572 de Kouki, R.C.A.) mesure 300 mm de longueur totale (LC = 266 mm + LQ = 34 mm); la plus grande femelle (MNHN 1996.6822 de Am-Dafok, R.C.A.) mesure 346 mm de longueur totale (LC = 320 mm + LQ = 26 mm).

HABITAT: ce taxon occupe les savanes soudaniennes, du Sénégal à l'Ethiopie.

DISTRIBUTION: Sénégal, Gambie, Nord-Est de la Guinée, Sud du Mali, Sud-Ouest du Burkina-Faso, Nord du Ghana, Nord du Togo, Nigeria, province Nord du Cameroun (et les monts Mandara dans la province de l'Extrême-Nord), RCA, Sud du Tchad, extrême Nord-Est du Zaïre, Sud et Est du Soudan, Ethiopie.

Prosymna greigerti collaris Sternfeld, 1908 Fig. 3

Prosymna meleagris var. collaris Sternfeld, 1908: 216
Prosymna meleagris Andersson, 1937: 8
'*P. m. meleagris* ↔ *P. m. greigerti* Intergrades' Broadley, 1980: 528

MATÉRIEL EXAMINÉ

Sénégal: Dagana, 100 Km au Nord de Saint-Louis (MNHN 1918.0064); Matam (MNHN 3528; Coll. Trape 3528S).

Mali: «Bamako» (MNHN 8806); Topokhoné (Coll. Trape 0129M); Yelimané, 350 Km au Nord-Ouest de Bamako (MNHN 1908.0021).

Burkina-Faso: Bamo (HV sans n°); Boromo (HV 2927); Bougrourou (HV 1987); Dorola (HV 4306); Fada (HV 4733); Garango (HV 2244); Gonsé (HV 5638); Kabougou (Coll. Chirio 6864X); Kantchari (HV 3657); Kosoghin (HV 4355); Marga (HV 0853); Maria-Tang (HV 2614); Nouna (HV 2862); Ouagadougou (HV 5378; HV 4733); Ouargaye (HV 4508); Pabré (HV 1995, HV 4126, HV 4470); Pô (HV 0382); Tapoa Djerma (Coll. Chirio 6935X); Tonkuy (HV sans n°; HV 5328-29).

Niger: Alambaré (Coll. Chirio 6575X); Gaya (Coll. Chirio 6880X); Kouré (Coll. Chirio 6907X); La Tapoa (Coll. Chirio 7105X); Malbaza (Coll. Trape 0536N); Piliki (Coll. Trape 0347N, 1472N); Touga Yacouba (Coll. Trape 0536N); Télà (Coll. Trape 1531N, 1545N).

Ghana: Gambaga (BMNH 1930.10.4.5).

Togo: Sansane-Mango [2 syntypes] (ZMB 21970).

Bénin: Bello Tonga, prè s de Karimama (Coll. Chirio 6515-16X); Campement de chasse BW Safari (Coll. Chirio 6676X); Niénié (Coll. Chirio 6806-07X).

Nigeria: Gadau (BMNH 1937.12.4.46, BMNH 1938.3.1.112-13); Maiduguri (BMNH 1962.182); Samaru (BMNH 1975.606); Sokoto (BMNH 1969.2267); Zaria (BMNH 1975.607).

Cameroun: Bacheo (MNHN 2002.0977-78); Djiddel (MNHN 2002.0980); Garoua (MNHN 1999.8440); Laf (MNHN 2002.0975-76; MNHN 2003.2917); Maroua (MNHN 2003.2916); Mokolo (MNHN 1962.0007-10).

Tchad: Maillao (MNHN 1978.1829-30); Mayo Kebbi (MNHN 1965.0031; MNHN 1956.0018; MNHN 1965.0046).

République Centrafricaine: Kouki (MNHN 1994.8224).

Soudan: vallée du Haut-Nil (MNHN 1904.0065).



FIG. 3
Prosymna g. collaris, coll. Chirio 7104X (La Tapoa, Niger - 03/06/2008) - Photo L. Chirio

TYPE ET LOCALITÉ-TYPE: ZMB 21970, 2 syntypes décrits par Sternfeld en 1908, originaires de Mangu (= Sansane-Mango), Togo.

IDENTIFICATION: les écailles derrière la nuque, sans apex blanc, forment une large selle noire entourée par 2 colliers blancs, l'un antérieur mordant sur les dernières plaques céphaliques, l'autre postérieur au niveau du 13ème rang de dorsales environ; en arrière du collier postérieur, chaque écaille dorsale est colorée de brun sombre avec une tache apicale blanche; 144-163 ventrales chez les ♂♂, 163-188 chez les ♀♀.

ECAILLURE: rostrale avec le bord saillant, concave sur sa face inférieure, la portion visible de dessus mesurant environ la moitié de la longueur de la préfrontale (la préfrontale est divisée par une suture sublatérale chez un des 2 syntypes de *P. collaris*); frontale plus longue que sa distance à l'extrémité du museau; loréale nettement plus longue que large; 1 préoculaire; 1 postoculaire; temporales 1+2 (très rarement 2+2); 5 supralabiales, les 2ème et 3ème en contact avec l'orbite; 8 infralabiales, les 3 premières en contact avec les sublinguales; écailles dorsales lisses, portant 2 fossettes apicales, 2 ou 3 fossettes sur les supracaudales; 144-163 ventrales chez les ♂♂ (m = 154 ±4,65; n=32), 163-188 chez les ♀♀ (m = 174,1 ±5,94; n=37); 30-37 sous-caudales paires chez les ♂♂ (m = 34 ±1,9; n=32), 20-26 chez les ♀♀ (m = 22,5 ±1,54; n=37); rapport LC/LQ compris entre 4,05 et 7,87 chez les ♂♂ (m = 6,13 ±1,11; n=32), entre 9,28 et 12,78 chez les ♀♀ (m = 11,11 ±0,86; n=37).

Coloration: dessus de la tête uniformément noir, côté ventral de la rostrale clair; les 2 ou 3 premières supralabiales sont blanches, les suivantes brun sombre; les infralabiales sont blanches, sauf les 2 dernières qui sont partiellement brunes; sur la nuque les écailles sont noires, sans apex blanc, et forment une selle sombre limitée par 2 colliers blancs:

- le collier blanc antérieur occupe la moitié des supralabiales 4 et 5, remonte à cheval sur la temporale antérieure et la temporale postérieure puis vers le bord postérieur des pariétales, en débordant sur le premier rang de dorsales; puis il s'étire vers l'arrière, et se termine généralement sur le 4ème rang longitudinal de dorsales; le collier antérieur est ouvert sur le rang vertébral et la moitié de chaque rang adjacent;
- entre les 2 colliers blancs on compte environ 13 rangs d'écailles entièrement noires, sans apex blanc;
- le collier postérieur blanc, généralement plus fin, est ouvert également sur le rang vertébral et la moitié des rangs adjacents.

En arrière du collier postérieur blanc, chaque écaille dorsale présente une coloration générale brun sombre avec une tache apicale blanche, qui s'agrandit graduellement des rangs médio-dorsaux vers les rangs latéraux (Fig. 3); le rang d'écailles latérales le plus proche des ventrales est entièrement blanc, ou avec un très fin croissant brun dans le haut de sa partie antérieure; les 8 premières ventrales sont noires, ce qui forme entre les deux colliers blancs décrits précédemment un collier gulaire sombre bien visible; en arrière, la coloration brune ne déborde généralement pas sur le bord latéral antérieur des ventrales, qui sont blanc neige. Il n'y a pas de dimorphisme sexuel apparent dans la coloration.

Taille: le plus grand mâle examiné (HV sans n° de Bamo, Burkina-Faso) mesure 318 mm de longueur totale (LC = 274 mm + LQ = 44 mm); la plus grande femelle (MNHN 1965.0046 de Mayo Kebbi, Tchad) mesure 372 mm de longueur totale (LC = 345 mm + LQ = 27 mm).

Habitat: Ce taxon occupe les biotopes les plus secs: savanes sahélo-soudaniennes et sahéliennes, du Nord du Sénégal au Soudan.

Distribution: Nord du Sénégal, Mali, Burkina-Faso, Sud du Niger, Nord du Ghana, Nord du Togo, Nord du Bénin, Nord du Nigeria, Extrême-Nord du Cameroun (sauf les Monts Mandara), Sud du Tchad, Extrême Nord-Ouest de la RCA, Soudan.

CLÉ DE DÉTERMINATION DES ESPÈCES DU COMPLEXE *P. MELEAGRIS*

1a coloration dorsale uniforme de la nuque à la queue: chaque écaille dorsale sombre présente une tache apicale blanche 2

1b les écailles derrière la nuque, sans apex blanc, forment une large selle noire entourée par 2 colliers blancs, l'un antérieur mordant sur les dernières plaques céphaliques, l'autre postérieur au niveau du 13ème rang de dorsales environ; en arrière du collier postérieur, chaque écaille dorsale sombre avec une tache apicale blanche; 147-164 ventrales chez les ♂♂, 168-188 chez les ♀♀ . . . . *Prosymna g. collaris*

2a toutes les ventrales ont le centre blanc; 132-147 ventrales chez les ♂♂, 147-167 chez les ♀♀. . . . . *Prosymna meleagris*

2b les premières ventrales sont entièrement sombres; 144-159 ventrales chez les ♂♂, 159-190 chez les ♀♀. . . . . *Prosymna g. greigerti*

DISCUSSION

La majorité des espèces du genre *Prosymna* se rencontre en Afrique australe et orientale, et il apparaît que c'est l'Afrique australe qui abrite le centre de spéciation le plus important du genre (Broadley, 1980); la plupart des espèces se rencontre en savane, à part *P. ornatissima* localisée en forêt d'altitude, *P. janii* sur les dunes côtières et *P. semifasciata* en forêts côtières. Hormis la forme orientale *P. ambigua bocagii*, espèce vicariante de *P. meleagris* (aisément identifiable par ses 6 supralabiales) qui ne dépasse pas la chaîne volcanique du Cameroun vers l'Ouest, le groupe plurispécifique *P. meleagris/ruspolii/somalica* défini par Broadley (1980) est le seul qui se rencontre au Nord de l'Equateur: c'est une partie de ce groupe qui nous intéresse ici.

Le présent travail nous a permis de mettre en évidence une corrélation entre les variations de coloration, les décomptes de l'écaillure ventrale et les données de divergences au niveau moléculaire dans le complexe polyspécifique *Prosymna meleagris s. l.*: ils séparent clairement la forme *meleagris* des 2 autres formes de coloration, qui sont deux sous-espèces de *P. greigerti*. On pourrait s'étonner du fait que Benedetto Roman, qui a si soigneusement observé les serpents d'Afrique de l'Ouest, n'ait pas remarqué les différences de coloration entre les formes *greigerti* et *collaris* au Burkina-Faso, alors Haute-Volta (Roman, 1980). Mais il faut préciser que, sur les 24 spécimens de *Prosymna* qu'il a récoltés, un seul est attribuable à la forme *greigerti*, et il a donc décrit dans son ouvrage la coloration de la forme *collaris*. On notera cependant qu'il a choisi pour illustrer cette espèce le seul spécimen de *P. g. greigerti* qu'il a récolté, dont la coloration uniforme (visible sur la photographie de la page 88) ne correspond justement pas à la description proposée: «la coloration est très caractéristique car sur le fond grisâtre ou noir il y a sur chaque écaille une tache blanche, et le cou porte sur sa partie dorsale un anneau blanc ou jaunâtre de la même couleur que le ventre» (Roman, 1980: 89).

La figure 4 cartographie les stations connues pour chaque taxon: nous l'avons obtenue en ajoutant aux localités de récolte des spécimens étudiés dans notre travail celles qui ont été citées par Broadley (1980). Sur toute l'étendue de leur aire de répartition, nous constatons une zonation latitudinale très nette dans la répartition de ces 3 taxons. *Prosymna g. collaris*, qui est la forme la plus xérophile, occupe les savanes sahélo-soudaniennes du Nord du Sénégal au Soudan, tandis que la forme *P. g. greigerti* occupe, systématiquement au Sud de la précédente, les savanes à affinités franchement soudaniennes du Sénégal à l'Ethiopie. Il est intéressant de noter que la seule région où on trouve une station de *P. g. greigerti* entourée de populations de *P. g. collaris*, dans le Nord du Cameroun, correspond aux Monts Mandara, un petit massif montagneux dans lequel des formations végétales typiquement soudaniennes sont isolées au milieu d'une région de steppes sahélo-soudaniennes. *P. meleagris* est cantonnée aux savanes guinéennes, de la côte sénégalaise à l'extrême Ouest du Cameroun; elle ne dépasse pas les reliefs de la chaîne volcanique du Cameroun à l'Est.

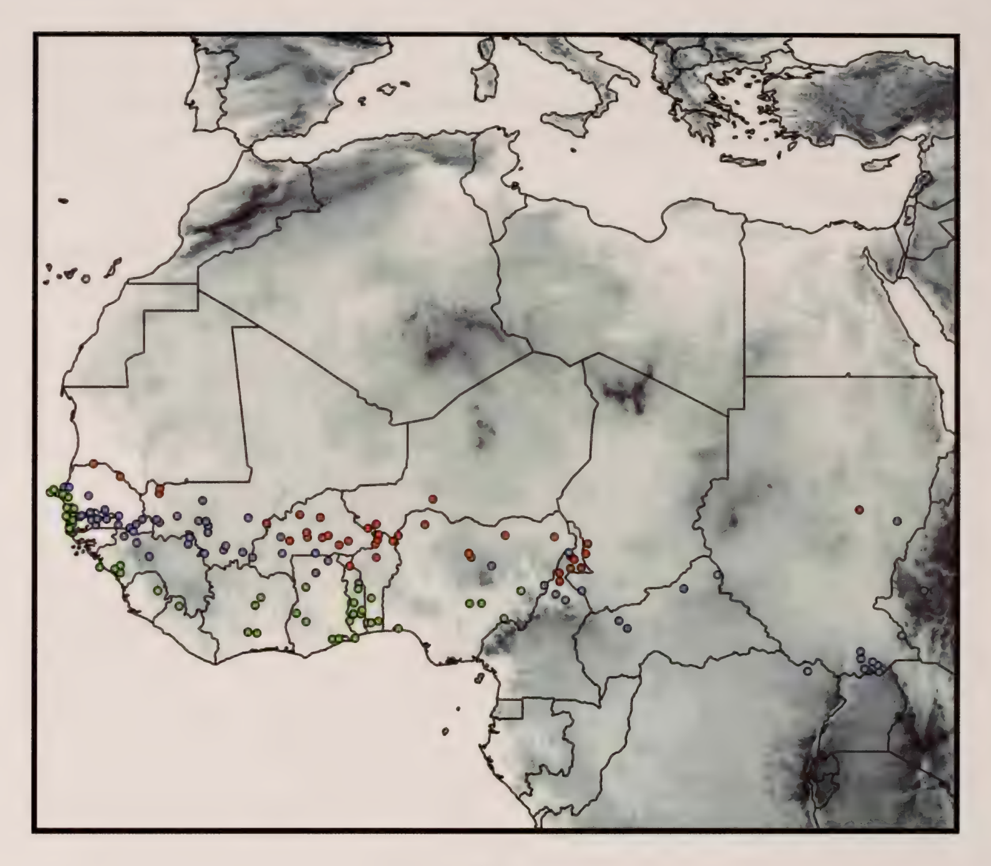


FIG. 4
Carte de répartition des espèces du complexe *Prosymna meleagris s.l.* en Afrique au Nord de l'Equateur. Les stations de collecte de *P. meleagris* sont en vert, celles de *P. g. greigerti* en bleu, et celles de *P. g. collaris* en rouge.

La découverte de la sympatrie des deux taxons *P. meleagris* et *P. g. greigerti* à Keur Bakar Mané (Sénégal) par l'un d'entre nous (J.-F. Trape) est en accord avec nos conclusions taxonomiques; par contre la station de Kouki en République Centrafricaine, où nous avons observé un juvénile présentant un pattern de coloration de type *collaris* atténué dans une population de type *greigerti*, doit donc être considérée comme étant à la frontière entre les deux sous-espèces de *P. greigerti*. Enfin, il apparaît clairement un cline Ouest/Est dans l'intensité de la coloration de la sous-espèce *P. g. greigerti*.

On sait qu'une extension maximale du Sahara vers le Sud au quaternaire récent, correspondant au dernier épisode glaciaire en Europe (24.000 à 12.000 BP environ), a provoqué un glissement des formations végétales de savanes près des côtes du golfe de Guinée entre 20.000 et 10.000 ans BP (Maley, 1996, 1999). La chaîne montagneuse volcanique du Cameroun, de direction grossièrement Nord-Est/Sud-Ouest, qui marque à peu près la frontière entre Nigeria et Cameroun, a alors pu jouer le rôle de barrière

géographique pour les espèces savanicoles (Maley & Brenac, 1998). Des populations d'une espèce ancestrale de *Prosymna* qui occupait les savanes périforestières ont alors été isolées à l'Ouest de la chaîne volcanique du Cameroun, où elles ont évolué séparément.

A la période interglaciaire suivante (à partir de 10000 BP environ), ces populations occidentales sont remontées vers le Nord, à la faveur de l'étalement des zones bioclimatiques: les populations des savanes périforestières ont alors donné naissance à l'espèce actuelle *P. meleagris*, qui est restée bloquée à l'Ouest de la barrière montagneuse. Le même type de répartition se retrouve chez d'autres serpents savanicoles comme l'élapidé *Naja katiensis* ou le lamprophiidé *Atractaspis micropholis*, dont les aires de répartition sont également limitées à l'Est par la ligne des reliefs camerounais; chez les lézards l'eublépharidé *Hemitheconyx caudicinctus*, l'agamidé *Agama boueti* et le scincidé *Chalcides thierryi* sont dans le même cas.

Puis à partir de ces populations de savanes guinéennes, on peut penser que des individus qui ont pu s'adapter à un climat plus sec ont été à l'origine de populations qui, elles, ont gagné les savanes soudaniennes pour donner naissance à *P. greigerti*. Cette espèce a dépassé les limites des reliefs camerounais au Nord, et a alors envahi les savanes soudaniennes jusqu'au Soudan et à l'Ethiopie.

A la faveur de mutations plus récentes, certains individus des savanes soudaniennes ont pu coloniser les savanes sahéliennes, sur toute la bordure nord des savanes soudaniennes du Sénégal au Soudan, donnant ainsi naissance à la sous-espèce *collaris*. Si la distance génétique qui sépare *P. meleagris* et *P. greigerti* semble bien s'accorder avec une séparation datant de 10 000 ans au plus, la distance génétique entre les deux sous-espèces de *P. greigerti* montre que leur séparation est beaucoup plus récente: peut-être pourrait-elle être liée à la perturbation brusque que Maley a mise en évidence entre 2500 et 2000 BP (Maley & Brenac, 1998; Maley, 2001). Les études palynologiques en cours en Afrique occidentale nous permettront sans doute de mieux connaître bientôt les variations d'extension des différents types de savanes à cette époque.

Enfin, la désertification actuelle des savanes péri-sahariennes a provoqué un léger glissement des zones bioclimatiques vers le Sud, isolant une population de *P. g. greigerti* dans les Monts Mandara, au milieu d'un ensemble de steppes sahélo-soudaniennes peuplées par *P. g. collaris*.

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Nous remercions ici vivement M. Barry Hughes pour le prêt de nombreux spécimens des collections du British Museum, et M. Ouedraogo du CNRST de Ouagadougou pour nous avoir permis d'étudier la collection de B. Roman, Jens B. Rasmussen du ZMUC pour le prêt du type de *P. meleagris*, le ZMB pour le prêt des syntypes de *P. g. collaris*. Nos remerciements vont également à Shai Meiri, du département de Zoologie de l'Université de Tel-Aviv (Israël), pour nous avoir aimablement fourni le fond de carte de l'Afrique au Nord du Sahara (Fig. 4).

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Notes on *Walckenaeria* species (Araneae: Linyphiidae) from China

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Notes on *Walckenaeria* species (Araneae: Linyphiidae) from China. - Results of a survey of the erigonine genus *Walckenaeria* in China are presented. The name *W. cylindrica* Xu, 1994 is placed in the synonymy of *Paikiniana mira* (Oi, 1960). *W. ferruginea* Seo, 1991 is removed from the synonymy of *W. orientalis* (Oliger, 1985) and its female is described for the first time. The type specimens of *W. yunnanensis* Xia *et al.*, 2001 are re-examined. Descriptions of *W. dahaituoensis* sp. n. and *W. asymmetrica* sp. n., and redescriptions of *W. karpinskii* (O. P.-Cambridge, 1873), *W. ferruginea* and *W. yunnanensis* are provided. A total of ten *Walckenaeria* species are currently known from China.

Keywords: Taxonomy - revalidation - type - new synonym - new species.

INTRODUCTION

The widely distributed linyphiid spider genus *Walckenaeria* was erected by Blackwall (1833) for the European species *W. acuminata* Blackwall, 1833 and *W. cuspidata* Blackwall, 1833. The original spelling of the name was given as above, but Blackwall emended it to *Walckenaera* in 1841. According to the rules of the International Commission on Zoological Nomenclature, the original spelling must stand and this was adopted by recent authors.

During the past 175 years a considerable number of *Walckenaeria* species have been described. Furthermore some revisional studies of this genus were done by Wunderlich (1972), Millidge (1983), Holm (1984) and Bosmans & De Smet (1993). So far, a total of 193 species were recorded from all over the world (Platnick, 2010). As most erigonines, *Walckenaeria* species live mostly at ground level, often in damp habitats, though some, as adults, may move up to low shrubs (Millidge, 1983). A completely eyeless *Walckenaeria* species was found in a limestone cave of central Kyushu, southwestern Japan (Saito & Irie, 1992).

A total of seven species were up to now reported from China: *W. antica* (Wider, 1834), *W. clavicornis* (Emerton, 1882), *W. cylindrica*, *W. karpinskii*, *W. nodosa* O. P.-Cambridge, 1873, *W. vigilax* (Blackwall, 1853) and *W. yunnanensis*. Our examination of the holotype of *W. cylindrica* (deposited in JLU) and a paratype and the allotype of *Paikiniana mira* (deposited in NSMT) proved that *W. cylindrica* is a junior synonym of *P. mira*. Our recent survey of collections showed a total of 10 *Walckenaeria* species present in China. Here we re-describe *W. karpinskii* in order to provide details of intra-specific variation, and *W. yunnanensis* because of the poor illustrations of its original description.

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MATERIAL AND METHODS

The spider material used for this study is deposited in the following institutions:

IZCAS Institute of Zoology, Chinese Academy of Sciences, Beijing, China;
JLU Jilin University, Changchun, China;
MHNG Muséum d'histoire naturelle de Genève, Switzerland;
NSMT National Museum of Nature and Science, Tokyo, Japan.

For each species only the original description and new misidentifications are listed. Synonyms listed in the spider catalog of Platnick (2010) are not repeated here. Locality names and distribution data are given according to current Chinese standard (Peng *et al.*, 2003).

Specimens were examined using an Olympus-SZ11 stereomicroscope and illustrated using an Olympus-BX41 compound microscope equipped with a drawing tube. Left male palps and female epigyna were illustrated after being separated from the body. Embolic divisions were dissected from the palpal bulb using sharp pins and forceps. Genital organs were immersed in 75% alcohol and examined under a compound microscope; embolic divisions and vulvae were mounted in Hoyer's Solution and examined in strong transmitted light against a white background. In addition, the ventral tegument of epigyna was removed by sharp pins and forceps to study the duct system of the vulvae under a compound microscope.

Eye diameters were measured at their widest extent. Leg measurements are given as: Total length (femur, patella, tibia, metatarsus, tarsus). All measurements are in millimeters. The terminology of genitalic structures follows Hormiga (2000) and Tanasevitch (2006).

The following abbreviations of somatic morphology and genitalic structures are used in the text and in the figures:

Somatic morphology: ALE, anterior lateral eye; AME, anterior median eye; PLE, posterior lateral eye; PME, posterior median eye; Tm I, position of trichobothrium on metatarsus I; Tm II, position of trichobothrium on metatarsus II; Tm IV, position of trichobothrium on metatarsus IV.

Male palp: C, column; DSA, distal suprategular apophysis; E, embolus; L, lamella; MM, median membrane; PC, paracymbium; PT, protegulum; PTA, prolateral tibial apophysis; R, radix; RBP, retrobasal cymbial process; RTA, retrolateral tibial apophysis; SPT, suprategulum; ST, subtegulum; T, tegulum; TP, tailpiece of radix.

Epigynum: CD, copulatory duct; CO, copulatory opening; DP, dorsal plate; DPS, dorsal plate scape; FD, fertilization duct; FO, fertilization opening; S, spermatheca; VP, ventral plate.

RESULTS

Walckenaeria asymmetrica sp. n. Figs 1-2

Holotype: IZCAS, without registration number; ♂; China, Henan Province, Nanyang City, Baotianman National Nature Reserve (33.32°N 112.20°E); collected by Q. Wang and Y. Lin; collected on 12.11.2005.

Paratypes: IZCAS (1♀) and MHNG (1♀ 1♂), without registration number; same data as for holotype.

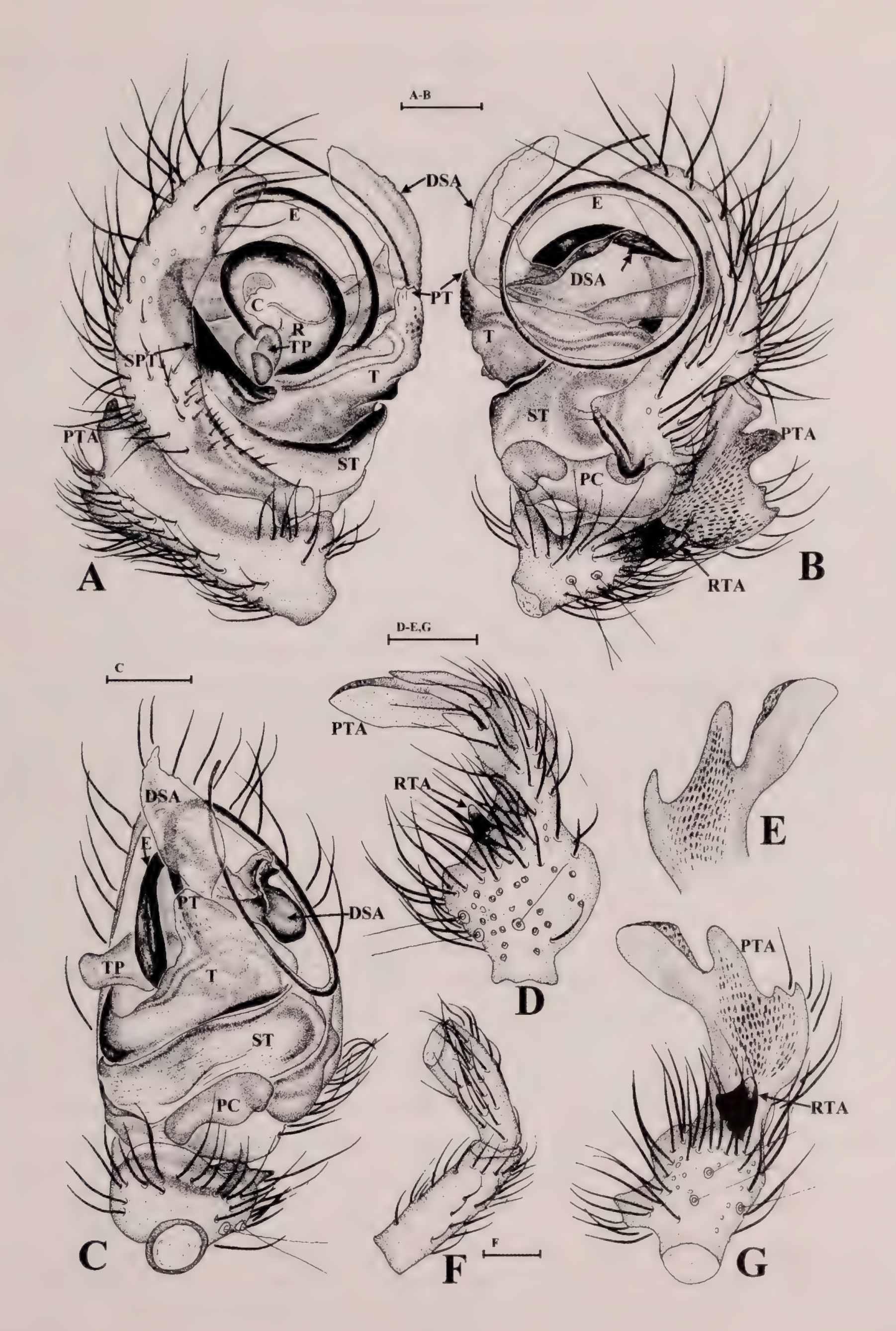


FIG. 1

Walckenaeria asymmetrica sp. n.; male holotype. (A) Distal part of left palp, prolateral view. (B) Same, retrolateral view (arrow indicating small triangular apophysis on upper margin of supra-tegulum). (C) Same, ventral view. (D) Tibia of left palp, dorsal view. (E) Distal part of tibia of right palp, lateral view. (F) Patella and femur of left palp, retrolateral view. (G) Tibia of left palp, lateral view. Scale lines: 0.1 mm.

DIAGNOSIS: The new species is similar to *W. chiyokoae* Saito, 1988, but the male can be distinguished by the shape of the prolateral apophysis of the palpal tibia, which is composed of 4 or 3 branches in *W. asymmetrica* (Fig. 1E, G), but only 2 in *W. chiyokoae*; by the strongly sclerotized dentiform retrolateral apophysis of the palpal tibia in *W. asymmetrica* (Fig. 1G) versus a slightly sclerotized rectangular apophysis in *W. chiyokoae*; by a long and strongly curved tailpiece in *W. chiyokoae*, but a shorter and more straight one in *W. asymmetrica* (Fig. 1A, C); by the different ratio of the length of the embolus to the length of the cymbium (about 3.9 in *W. asymmetrica* and 4.9 in *W. chiyokoae*). The female is extremely similar to that of *W. chiyokoae*, except for the relatively straight and undeveloped anterior part of the copulatory ducts, and females cannot be safely identified unless collected together with males.

DESCRIPTION OF MALE HOLOTYPE: Total length 2.14. Carapace 1.05 long, 0.78 wide, light orange. Head raised into a lobe carrying posterior median eyes (Fig. 2B); a conspicuous sulcus running back from behind PLE and containing a small pit anteriorly (Fig. 2B). Clypeus 0.21 high, with a patch of hairs in the ocular area and on the clypeus (Fig. 2B). AME diameter 0.05, ALE 0.08, PME 0.10, PLE 0.08, AME interdistance 0.31 times their diameter, AME-ALE interdistance 0.67 times ALE diameter, PME interdistance 1.06 times their diameter, PME-PLE interdistance 2.52 times PLE diameter. Sternum 0.59 long, 0.57 wide. Coxa IV interdistance 1.19 times their width. Chelicera light orange, with 4 promarginal and 2 retromarginal teeth (Fig. 2C). Tibia of leg I 8.94 times longer than deep. Tm I 0.53, Tm IV present. Tibiae of all legs with very short spines and their length almost half of the width of tibiae. Number of dorsal spines on tibiae of legs I-IV: 1-1-1-1. Leg measurements: I 3.56 (1.02, 0.30, 0.95, 0.78, 0.51); II 3.38 (0.96, 0.29, 0.89, 0.76, 0.49); III 2.84 (0.81, 0.29, 0.68, 0.66, 0.41); IV 3.70 (1.03, 0.30, 0.98, 0.91, 0.49).

Palp: Patella a bit shorter than femur (Fig. 1F). Tibia short, armed with 1 strongly sclerotized, dentiform retrolateral apophysis and 1 large prolateral apophysis with scaly inner surface and distal margin with 3 (right male palp) or 4 (left male palp) branches; with 1 prolateral and 2 retrolateral trichobothria (Fig. 1D). Paracymbium C-shaped, basal part folded downwards (Fig. 1B). Tegulum distal to subtegulum in unexpanded palp (Fig. 1B). Protegulum with some unconspicuous papillae (Fig. 1A, B). Distal suprategular apophysis well developed, ending in a cavity accommodating distal one-sixth of long coiled embolus; with a broad groove retrolaterally and bearing a small tooth on the upper side (Fig. 1B, C). Embolic division very simple. Embolus very long (about 1.5 cm), with a narrow membrane along inner margin. Tailpiece short, twisted clockwise in prolateral view, ending in a lobe in ventral view (Fig. 1A).

DESCRIPTION OF FEMALE PARATYPE (IZCAS): Carapace (Fig. 2A) unmodified, similar to that of male in coloration. Total length 2.27. Carapace 0.94 long, 0.78 wide. Clypeus 0.18 high. AME diameter 0.06, ALE 0.09, PME 0.08, PLE 0.08, AME interdistance 0.26 times their diameter, AME-ALE interdistance 0.38 times ALE diameter, PME interdistance 0.36 times their diameter, PME-PLE interdistance 0.42 times PLE diameter. Sternum 0.59 long, 0.59 wide. Coxa IV interdistance 0.77 times their width. Chelicera with 4 promarginal and 2 retromarginal teeth. Tibia of leg I 6.52 times longer than deep. Tm I 0.52, Tm IV present. Length of spine on tibiae of all legs almost equal

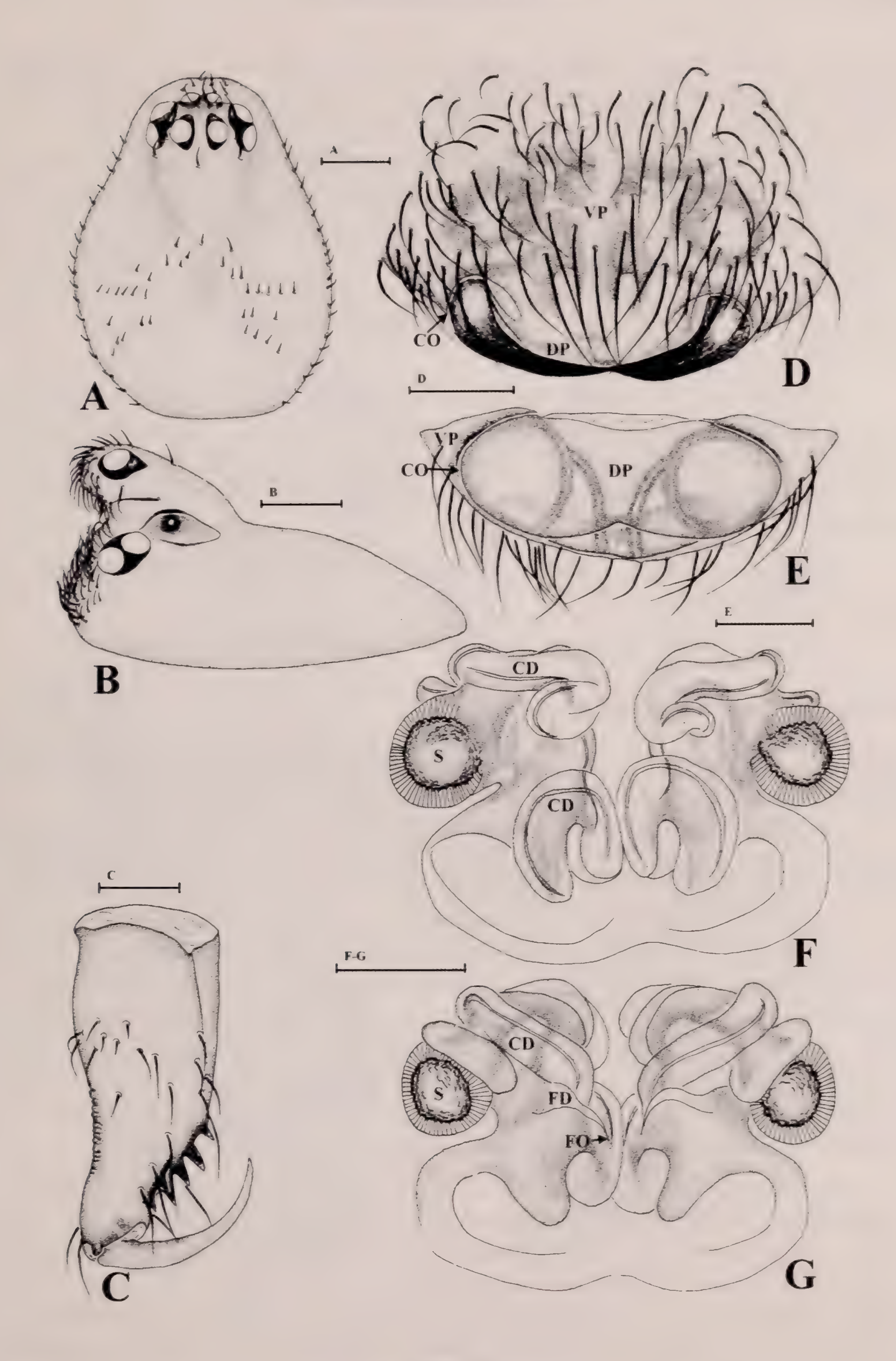


FIG. 2

Walckenaeria asymmetrica sp. n.; male holotype (B, C) and female paratype (A, D-G). (A) Carapace, dorsal view. (B) Same, lateral view. (C) Left chelicera, posterior view. (D) Epigynum, ventral view. (E) Same, posterior view. (F) Vulva, ventral view. (G) Same, dorsal view. Scale lines: A, B=0.2 mm, C-G=0.1 mm.

to width of tibiae. Number of dorsal spines on tibiae of legs I-IV: 1-1-1-1. Leg measurements: I 3.29 (0.98, 0.31, 0.86, 0.69, 0.46); II 3.19 (0.96, 0.30, 0.81, 0.68, 0.45); III 2.76 (0.82, 0.27, 0.68, 0.61, 0.38); IV 3.59 (1.04, 0.27, 0.95, 0.86, 0.46).

Surface of epigynum almost transparent. Posterior margin of dorsal plate lip-shaped and totally exposed in ventral view (Fig. 2D). Copulatory openings long, curved, situated at the junction of dorsal plate and ventral plate (Fig. 2D, E). Copulatory ducts enclosed in a strongly sclerotized and rather complicated capsule, forming a pair of large loops on ventral side (Fig. 2F). Spermathecae globular, separated from each other by 3 times their diameter (Fig. 2F, G). Fertilization ducts very short, mesally situated (Fig. 2G).

Etymology: The specific name is an adjective of the Greek noun symmetria (= symmetry), combined with the alpha privativum, and refers to asymmetrical male palps of the holotype (IZCAS) and paratype (MHNG). The distal margin of the prolateral tibial apophysis of the left palps of both specimens has 4 branches, but the right palp only 3 branches.

Distribution: Only known from Baotianman National Nature Reserve in the Henan Province, China.

Habitat: The spiders were found under dead leaves on the ground.

Walckenaeria dahaituoensis sp. n. Figs 3-5

Holotype: IZCAS, without registration number; ♂; China, Hebei Province, Zhangjiakou City, Chicheng County, Dahaituo National Nature Reserve (40.90°N 115.83°E); collected by Q. Wang, Y. Song and G. Zheng; collected on 5.11.2005.

Paratypes: IZCAS (3♂ 5♀) and MHNG (2♀ 2♂), without registration number; same data as for holotype. – IZCAS, without registration number; 3♂; China, Beijing, Mentougou District, Xiaolongmen Forest Park, alt. 1225m; collected by X. Yu; collected on 21.09.1999.

Diagnosis: The new species is similar to *W. chiyokoae* and *W. asymmetrica* sp.n., but can be distinguished from these two species by the additional rows of hairs at the base of the lateral eyes in males (Fig. 4A), the shape of the male palpal tibial apophyses (Fig. 3E), the strongly curved, distally pointed tailpiece of the embolic division (Fig. 3A), the equally broad lip-shaped extension of the dorsal plate of the epigynum (Fig. 4D) and the different course of the copulatory ducts in posterior view (Fig. 4G). The vulva system is very similar to that of *W. chiyokoae* and *W. asymmetrica*, and females can only be safely identified when collected together with males.

Description of holotype: Total length 2.54. Carapace 1.38 long, 0.86 wide, orange-brown. Head elevated into a very large lobe carrying posterior median eyes; a shallow sulcus running back from behind PLE and containing a small pit anteriorly; 5 long hairs arranged in a line at each base of lateral eye (Fig. 4A, B). Clypeus 0.31 high, slightly swollen and with a patch of weak hairs in the center (Fig. 4A). AME diameter 0.05, ALE 0.07, PME 0.08, PLE 0.08, AME interdistance 0.63 times their diameter, AME-ALE interdistance 1.73 times ALE diameter, PME interdistance 3.08 times their diameter, PME-PLE interdistance 3.08 times PLE diameter. Sternum 0.71 long, 0.64 wide. Coxa IV interdistance 1.06 times their width. Chelicera chestnut-brown, with 4 promarginal and 4 retromarginal teeth. Tibia of leg I 8.60 times longer than deep. Tm

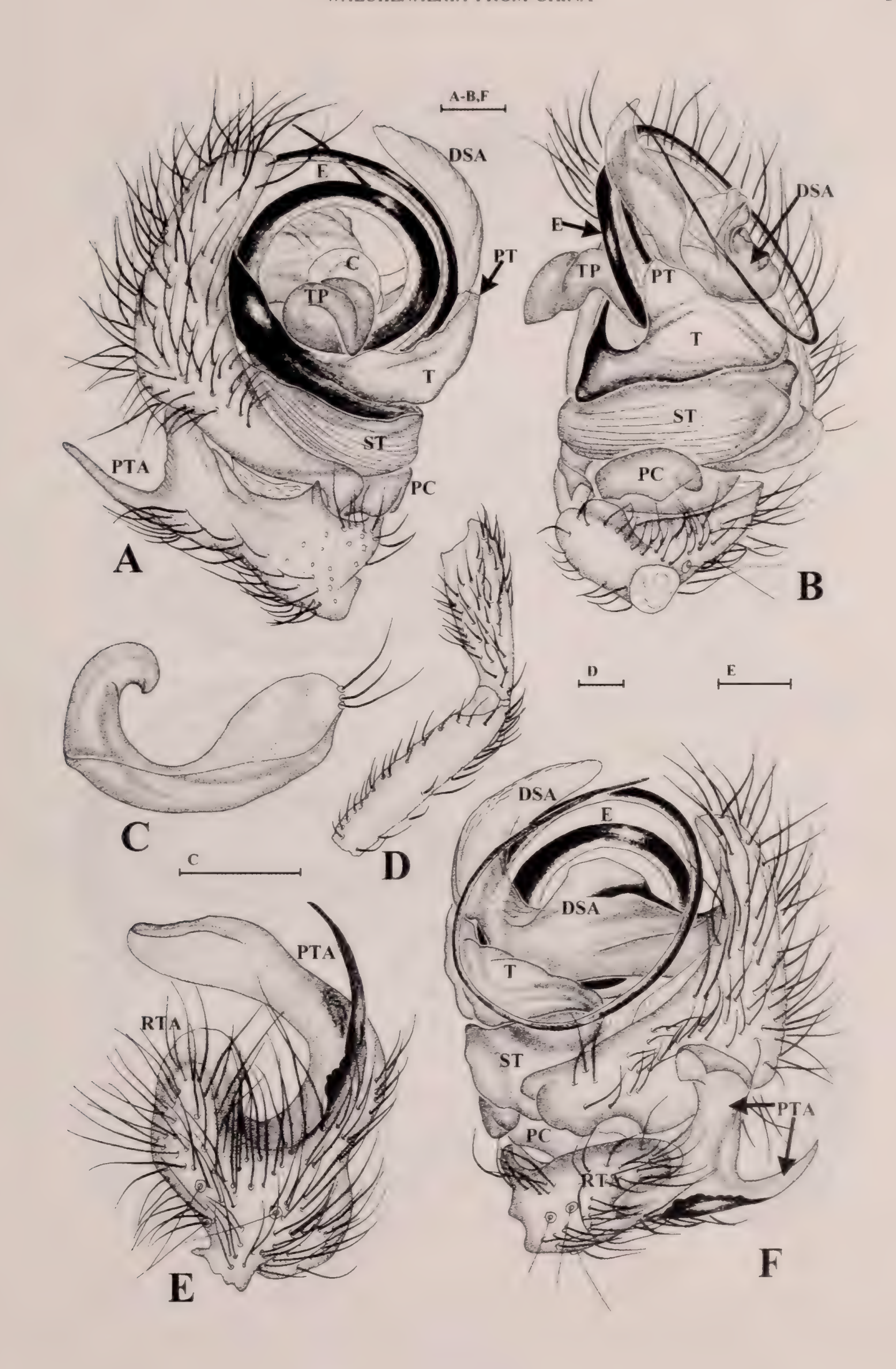


FIG. 3

Walckenaeria dahaituoensis sp. n.; male holotype. (A) Distal part of left palp, prolateral view. (B) Same, ventral view. (C) Paracymbium, ventral view. (D) Patella and femur of left palp, retrolateral view. (E) Tibia of left palp, dorsal view. (F) Distal part of left palp, retrolateral view. Scale lines: 0.1 mm.

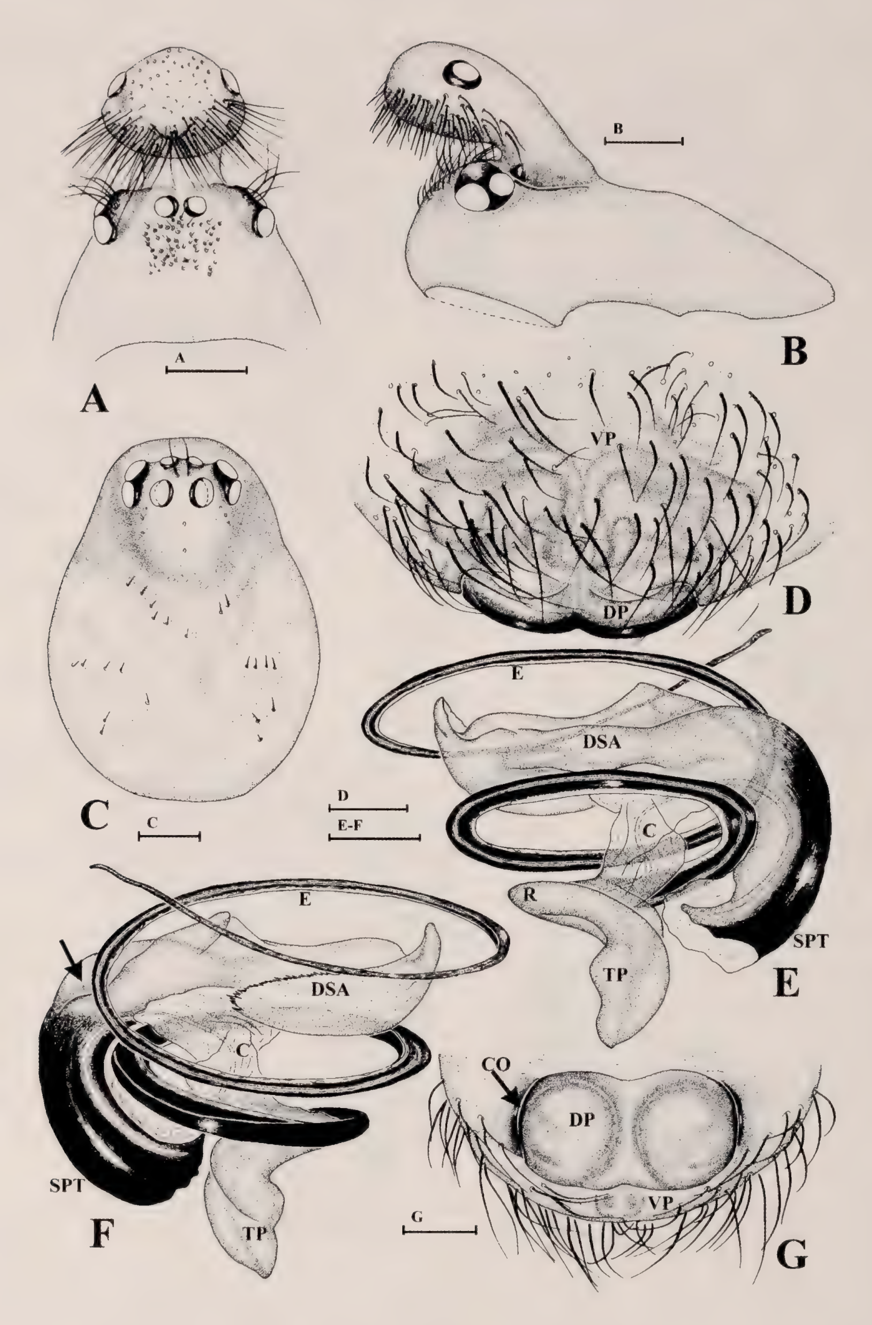


FIG. 4

Walckenaeria dahaituoensis sp. n.; male holotype (A, B, E, F) and female paratype from Dahiatuo N.N.R. (C, D, G). (A) Carapace, frontal view. (B) Same, lateral view. (C) Same, dorsal view. (D) Epigynum, ventral view. (E) Embolic division (with DSA), dorsal view. (F) Same, ventral view (arrow indicating retrolateral groove of supratugulum). (G) Epigynum, posterior view. Scale lines: A-C=0.2 mm, D-G=0.1 mm.

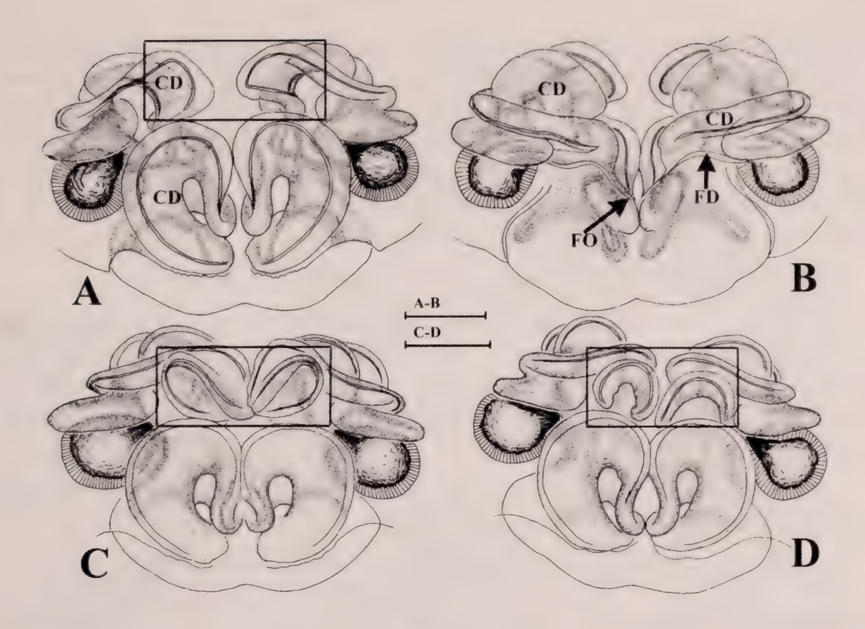


FIG. 5

Walckenaeria dahaituoensis sp. n.; three different female paratypes. (A, C, D) Vulva, ventral view. (B) Same, dorsal view. Scale lines: 0.1 mm.

I 0.59, Tm IV present. Tibiae of all legs with very short spines, one third of width of tibiae. Number of dorsal spines on tibiae of legs I-IV: 1-1-1-1. Leg measurements: I 4.09 (1.14, 0.33, 1.08, 0.95, 0.59); II 3.99 (1.11, 0.33, 1.05, 0.93, 0.59); III 3.31 (0.94, 0.30, 0.81, 0.77, 0.49); IV 4.26 (1.16, 0.31, 1.14, 1.08, 0.57).

Palp: Patella slightly shorter than femur (Fig. 3D). Tibia short, armed with 1 stout retrolateral apophysis and 1 large biforked prolateral apophysis, the latter composed of 1 long broad branch and 1 strongly sclerotized needle-like branch; with 1 prolateral and 2 retrolateral trichobothria (Fig. 3E). Paracymbium C-shaped, slightly hooked, with 3 hairs on the basal arm near its junction with the cymbium (Fig. 3C). Tegulum distal to subtegulum in unexpanded palp (Fig. 3F). Protegulum without papillae (Fig. 3A, B). Distal suprategular apophysis similar to that of W. chiyokoae but without small tooth on upper margin of groove (Fig. 3F). Column rounded, totally visible in prolateral view (Fig. 3A). Embolic division (Fig. 4E, F) similar to that of the two above mentioned species, but tailpiece pointed and strongly curved downwards (Fig. 3A).

DESCRIPTION OF FEMALE PARATYPE (from type locality): Carapace (Fig. 4C) unmodified, similar to that of male in coloration. Total length 2.20. Carapace 1.08 long, 0.80 wide. Clypeus 0.23 high. AME diameter 0.06, ALE 0.09, PME 0.08, PLE 0.08, AME interdistance 0.44 times their diameter, AME-ALE interdistance 0.47 times ALE diameter, PME interdistance 1.08 times their diameter, PME-PLE interdistance 0.77 times PLE diameter. Sternum 0.72 long, 0.64 wide. Coxa IV interdistance 1.13 times their width. Chelicera with 4 promarginal and 2 retromarginal teeth. Tibia of leg I 7.27

times longer than deep. Tm I 0.61, Tm IV present. Spines on tibiae of all legs as long as width of tibiae. Number of dorsal spines on tibiae of legs I-IV: 1-1-1-1. Leg measurements: I 3.83 (1.13, 0.34, 1.00, 0.84, 0.52); II 3.68 (1.08, 0.34, 0.94, 0.82, 0.51); III 3.22 (0.93, 0.30, 0.79, 0.75, 0.46); IV 4.09 (1.14, 0.30, 1.12, 1.01, 0.53).

Surface of epigynum almost transparent. Doral plate with evenly broad lip-shaped extension totally exposed in ventral view (Fig. 4D). Vulva system (Fig. 5A, B) similar to that of *W. chiyokoae* and *W. asymmetrica* sp. n.

ETYMOLOGY: The specific name is taken from the type locality.

VARIATION: 7♀ and 6♂ were measured. The total length varies from 2.58 to 2.64 in males, 2.20 to 2.33 in females. The carapace length is 1.38 to 1.42 in males, 1.08 to 1.22 in females; width 0.86 to 0.88 in males, 0.80 to 0.89 in females. The species shows considerable intraspecific variation in the shape of the anterior part of the vulva (Fig. 5A, C, D).

DISTRIBUTION: Only known from Baotianman Nature Reserve in Henan Province, China.

HABITAT: The spiders were found in the leaf litter of a birch forest.

Walckenaeria ferruginea Seo, 1991 Figs 6-7

Walckenaeria ferruginea Seo, 1991: 36, figs 1-6. Here re-established as a valid species name.
Walckenaeria orientalis (Oliger, 1985): synonymized by Marusik & Koponen (2000: 62).

MATERIAL EXAMINED: IZCAS, without registration number; 2♂ 2♀; China, Liaoning Province, Qingyuan County (30.10°N 101.75°E); collected by S. Gao; collected on 11.1985. – IZCAS, X98-053; 5♀; no other information available.

DIAGNOSIS: *W. ferruginea* is very similar to *W. orientalis*, but males can be distinguished by the shape of their retrolateral tibial apophysis, which is broad and blunt in *W. ferruginea* (Fig. 6D, G), but strongly sclerotized and dentiform in *W. orientalis*; by the modifications along the inner margin of the embolus, which has a large curved lamella near the base of the radix and a small dark triangular apophysis near the tip of the embolus in *W. ferruginea* (Figs 6G, 7E), but a curved rectangular lamella near the base of the radix and a hook near the tip of the embolus in *W. orientalis*; by the strongly curved tailpiece of the radix in *W. ferruginea* (Fig. 6F), which is almost straight in *W. orientalis*. Females can be distinguished by the nearly flat posterior margin of the dorsal plate (in ventral view) in *W. ferruginea* (Fig. 7D), which is protruding in *W. orientalis*; by the presence of a small nick in the middle of the posterior margin of the ventral plate in *W. ferruginea* (Fig. 7D), which is protruding in *W. orientalis*; by the arrangement of the spermathecae, which are parallel in *W. ferruginea* (Fig. 7D), but divergent anteriorly in *W. orientalis*.

DESCRIPTION OF MALE (from Qingyuan): Total length 2.23. Carapace 1.03 long, 0.75 wide, reddish brown, slightly elevated, with a pair of small "horns" directed anterolaterally (Fig. 6 A, B). Clypeus 0.19 high. Abdomen silver grey. AME diameter 0.05, ALE 0.08, PME 0.08, PLE 0.08, AME interdistance 0.40 times their diameter, AME-ALE interdistance 0.46 times ALE diameter, PME interdistance 0.35 times their diameter, PME-PLE interdistance 0.68 times PLE diameter. Sternum 0.64 long, 0.58 wide. Coxa IV interdistance 1.00 times their width. Chelicera with 4 promarginal and

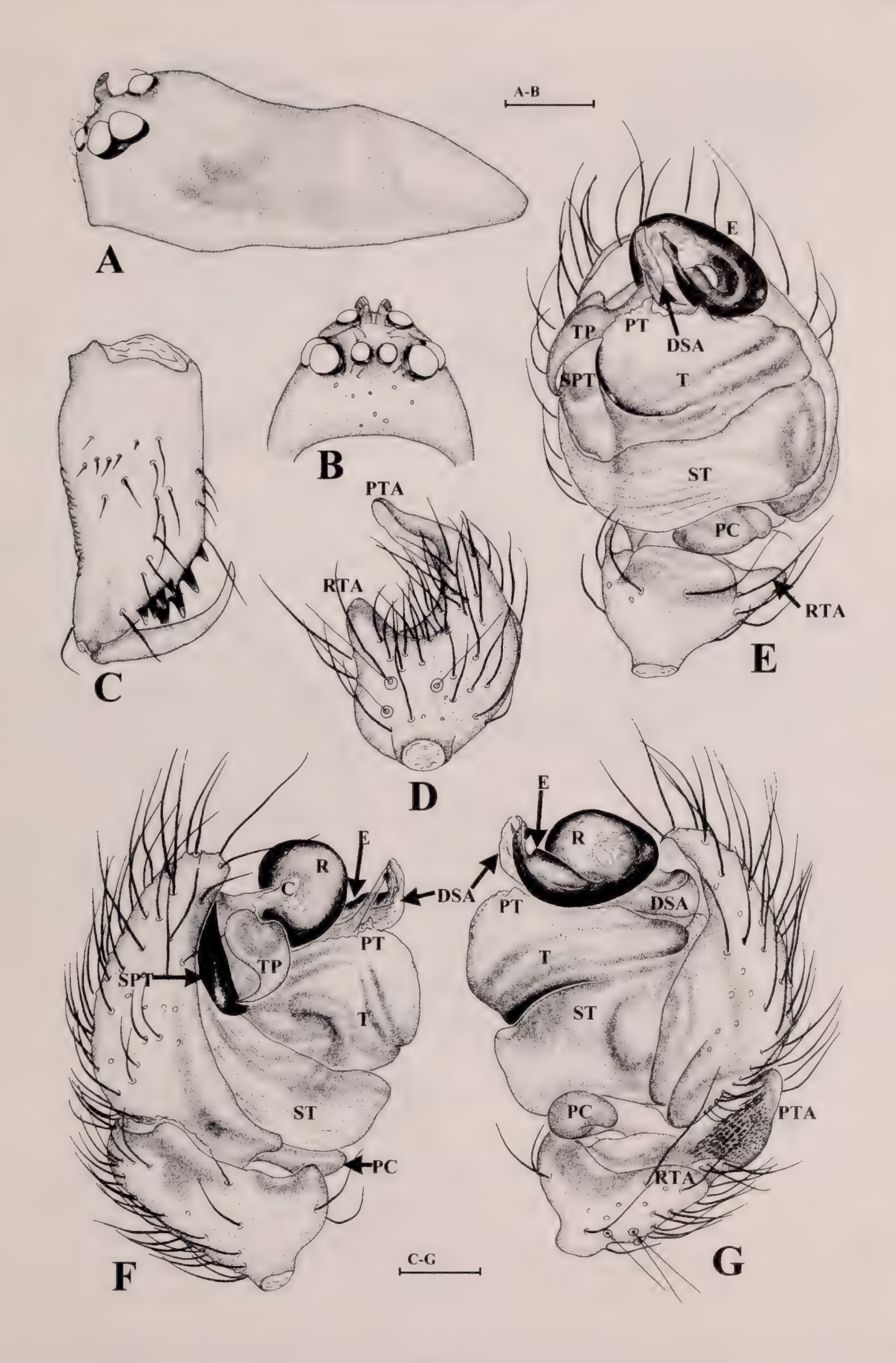


FIG. 6

Walckenaeria ferruginea; male from Liaoning, China. (A) Carapace, lateral view. (B) Same, frontal view. (C) Left chelicera, posterior view. (D) Tibia of left palp, dorsal view. (E) Distal part of left palp, ventral view. (F) Same, prolateral view. (G) Same, retrolateral view. Scale lines: A, B=0.2 mm, C-G=0.1 mm.

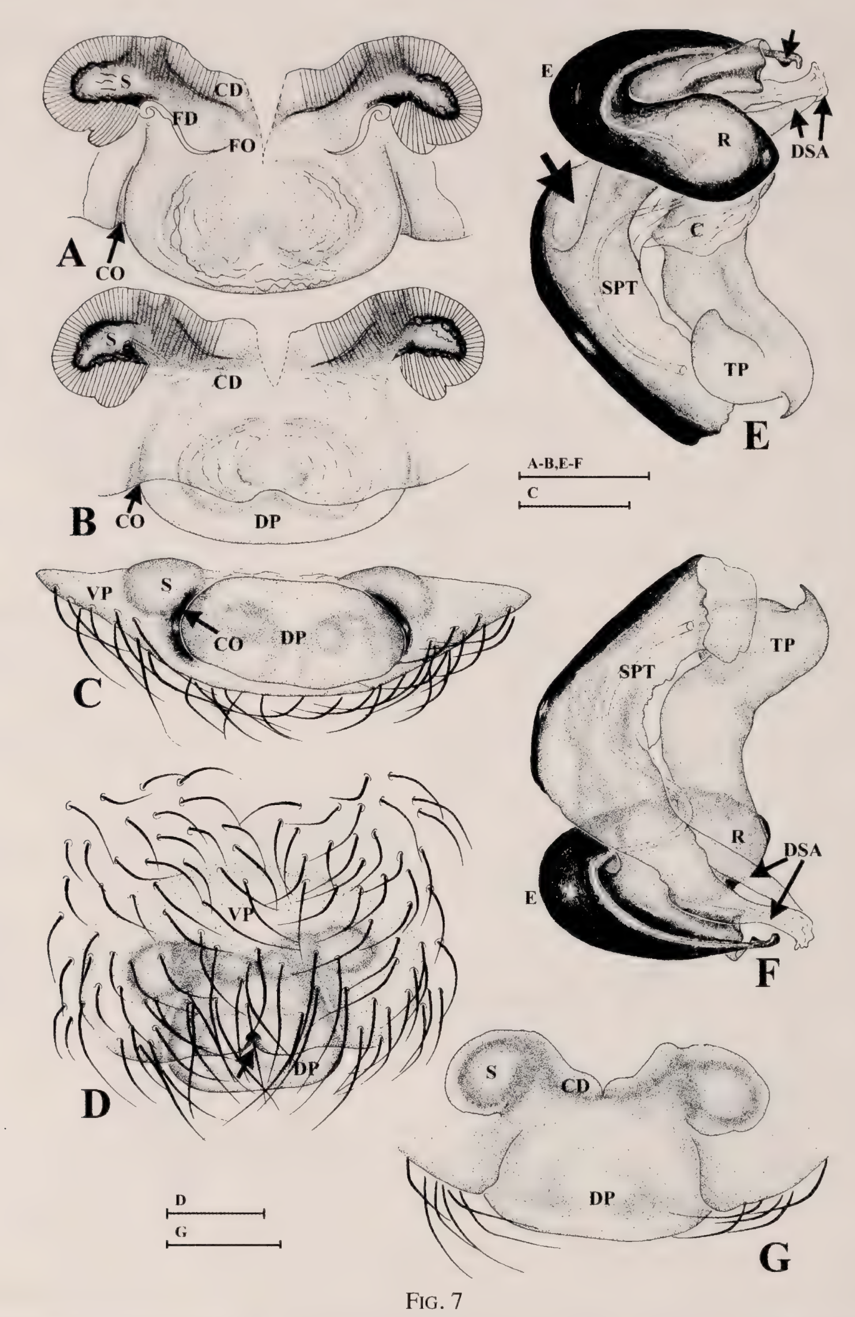


Fig. 7

Walckenaeria ferruginea; male (E, F) and female (A-D, G) from Liaoning, China. (A) Vulva, dorsal view. (B) Same, ventral view. (C) Epigynum, posterior view. (D) Same, ventral view (arrow pointing to nick in middle of posterior margin of ventral plate). (E) Embolic division, ventral view (with DSA; smallest arrow pointing to triangular apophysis near tip of embolus; largest arrow indicating retrolateral groove of suprategulum). (F) Same, dorsal view. (G) Epigynum, dorsal view. Scale lines: 0.1 mm.

4 retromarginal teeth (Fig. 6C). Tibia of leg I 6.55 times longer than deep. Tm I 0.50, Tm IV present. Number of dorsal spines on tibiae of legs I-IV: 2-2-1-1. Leg measurements: I 3.14 (0.91, 0.28, 0.82, 0.68, 0.46); II 2.99 (0.85, 0.28, 0.78, 0.64, 0.44); III 2.58 (0.74, 0.26, 0.63, 0.58, 0.38); IV 3.29 (0.91, 0.26, 0.89, 0.78, 0.46).

Palp: Tibia short, armed with 1 stout retrolateral apophysis and 1 long strongly curved prolateral apophysis with scaly inner surface (Fig. 6G); with 1 prolateral and 2 retrolateral trichobothria (Fig. 6D). Paracymbium C-shaped, terminating in a blunt hook (Fig. 6G). Tegulum distal to subtegulum in unexpanded palp (Fig. 6G). Protegulum extended upwards to form 2 small triangular membranes (Fig. 6E). Suprategulum distally produced into 1 long pointed apophysis and 1 partly membranous apophysis (Fig. 7F). Embolic division (Fig. 7E, F): radix swollen; embolus very thick, with complicated apophyses along inner margin; tailpiece broad at base, abruptly narrowed to a pointed dorsal-curved apex.

Description of female (from Qingyuan): Carapace unmodified, similar to that of male in coloration. Total length 2.52. Carapace 1.14 long, 0.83 wide. Clypeus 0.17 high. AME diameter 0.06, ALE 0.09, PME 0.10, PLE 0.09, AME interdistance 0.21 times their diameter, AME-ALE interdistance 0.20 times ALE diameter, PME interdistance 0.38 times their diameter, PME-PLE interdistance 0.41 times PLE diameter. Sternum 0.71 long, 0.61 wide. Coxa IV interdistance 1.03 times their width. Chelicera with 4 promarginal and 4 retromarginal teeth. Tibia of leg I 6.22 times longer than deep. Tm I 0.48, Tm IV present. Number of dorsal spines on tibiae of legs I-IV: 2-2-1-1. Leg measurements: I 3.43 (1.03, 0.31, 0.88, 0.73, 0.48); II 3.27 (0.98, 0.29, 0.84, 0.71, 0.46); III 2.86 (0.83, 0.29, 0.70, 0.64, 0.39); IV 3.64 (1.02, 0.29, 0.98, 0.88, 0.48).

Epigynum simple. Dorsal plate partly visible in ventral view (Fig. 7D) and elliptical in posterior view (Fig. 7C). Copulatory openings long and narrow, present at junction of dorsal plate and ventral plate. Copulatory ducts enclosed in a simple sclerotized capsule (Fig. 7A, B). Spermathecae somewhat elliptical, separated from each other by about their maximum diameter (Fig. 7G), split visible in anterior part of vulva resulting from damage during dissection (Fig. 7A, B).

Variation: 2♂ and 7♀ were measured. Total length varies from 2.23 to 2.38 in males, 2.52 to 3.83 in females.

Distribution: Korea, China (Liaoning Province).

Walckenaeria karpinskii (O. P.-Cambridge, 1873) Figs 8-10

Erigone karpinskii O. P.-Cambridge, 1873: 447, pl. 41, fig. 12.

Material examined: IZCAS, without registration number; 5♀ 2♂; China, Hebei Province, Zhangjiakou City, Chicheng County, Dahaituo National Nature Reserve (40.90°N 115.83°E); collected by Q. Wang, Y. Song and G. Zheng; collected on 5.11.2005.

Diagnosis: *W. karpinskii* is similar to *W. clavicornis* and *W. korobeinikovi* Esyunin & Efimik, 1996, but can be distinguished by the shape of the palpal tibia (Fig. 9C, F; cf. Esyunin & Efimik, 1996: fig. 4a-f; Millidge, 1983: figs 261-266) and of the dorsal plate of the epigynum (Fig. 10D, E; cf. Esyunin & Efimik, 1996: fig. 5a-h).



FIG. 8

Walckenaeria karpinskii; male from Hebei, China. (A) Distal part of left palp, prolateral view. (B) Embolic division, ventral view. (C) Same, dorsal view. (D) Distal part of suprategulum, ventral view (arrow indicating retrolateral groove). (E) Distal part of embolus (ventral view). (F) Distal part of left palp, ventral view. (G) Same, retrolateral view. Scale lines: 0.1 mm.

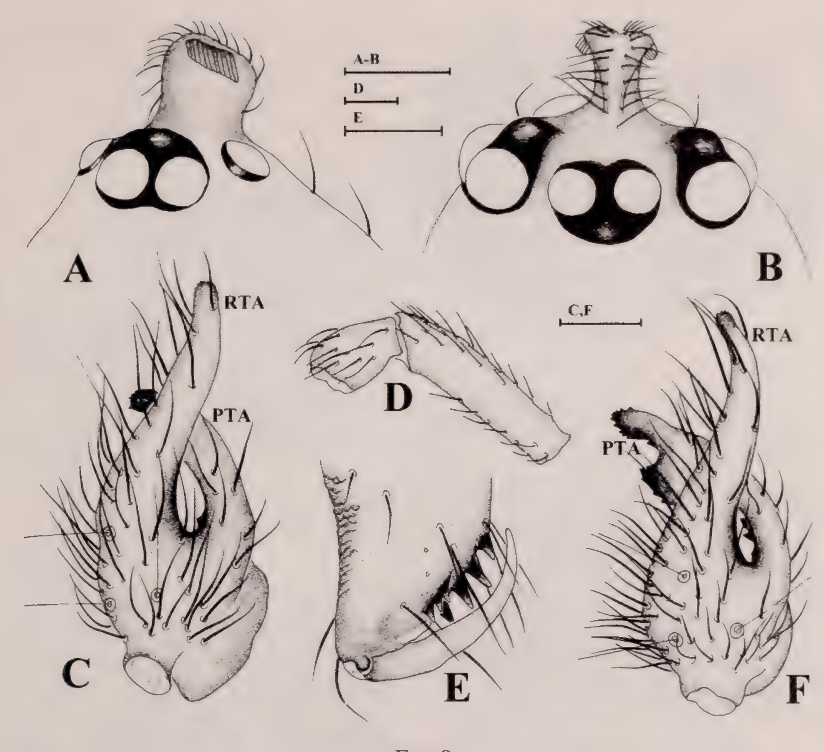


FIG. 9

Walckenaeria karpinskii; male from Hebei, China. (A) Eye region, lateral view. (B) Same, frontal view. (C) Tibia of left palp, dorsomesal view. (D) Patella and femur of left palp, retrolateral view. (E) Left chelicera, posterior view. (F) Tibia of left palp, dorsal view. Scale lines: 0.1 mm.

RE-DESCRIPTION OF MALE (from Dahaituo National Nature Reserve): Total length 2.08. Carapace 0.98 long, 0.71 wide, orange-brown, with a stout horn in ocular area (Fig. 9A, B). Clypeus 0.20 high. AME diameter 0.04, ALE 0.07, PME 0.06, PLE 0.07, AME interdistance 0.46 times their diameter, AME-ALE interdistance 0.38 times ALE diameter, PME interdistance 0.50 times their diameter, PME-PLE interdistance 0.55 times PLE diameter. Sternum 0.58 long, 0.53 wide. Coxa IV interdistance 1.08 times their width. Chelicera chestnut-brown, with 4 promarginal and 3 retromarginal teeth (Fig. 9E). Tibia of leg I 5.37 times longer than deep. Tm I 0.45, Tm IV present. Number of dorsal spines on tibiae of legs I-IV: 2-2-1-1. Leg measurements: I 2.39 (0.76, 0.28, 0.46, 0.50, 0.23); II 2.38 (0.69, 0.27, 0.58, 0.49, 0.35); III 2.06 (0.57, 0.24, 0.47, 0.44, 0.34); IV 2.79 (0.78, 0.25, 0.72, 0.63, 0.41).

Palp: Patella length half of femur length (Fig. 9D). Tibia short, armed with 2 well-developed apophyses; retrolateral apophysis long, slightly curved, decorated interiorly with some unconspicuous teeth (Fig. 8F, G); prolateral apophysis biforked, strongly sclerotized, serrated distally (Fig. 9F); with 1 prolateral and 2 retrolateral trichobothria. Paracymbium C-shaped, with distal end hooked (Fig. 8G). Tegulum distal to subtegulum in unexpanded palp (Fig. 8F). Protegulum relatively flat (Fig. 8F). Suprategulum (Fig. 8D) terminating in strongly sclerotized point, this not visible in

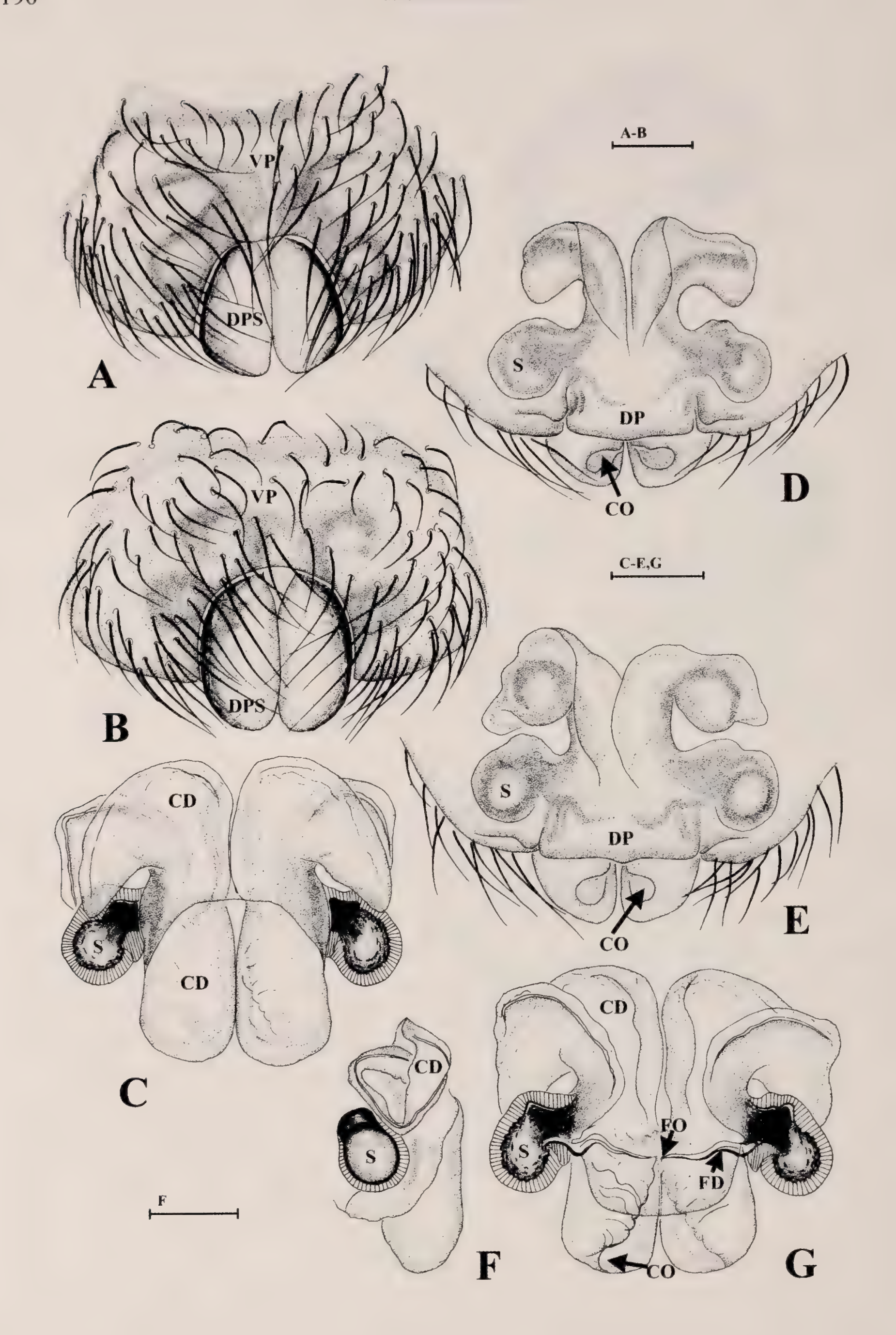


Fig. 10

Walckenaeria karpinskii; two females from Hebei, China. (A, B) Epigyna, ventral view. (C) Vulva, ventral view. (D, E) Epigyna, dorsal view. (F) Vulva, lateral view. (G) Same, dorsal view. Scale lines: 0.1 mm.

unexpanded palp. A suprategular groove visible in unexpanded palp in retrolateral view (Fig. 8G). Embolic division: median membrane long and broad, enveloping distal end of long coiled embolus (Fig. 8B, C, G); tailpiece relatively short, strongly curved upwards, in prolateral view with a rounded piece extended upwards from anterior margin (Fig. 8A); embolus very broad at base, gradually narrowed towards the end, slightly sclerotized along inner margin (Fig. 8E, G).

RE-DESCRIPTION OF FEMALE (from Dahaituo National Nature Reserve): Carapace unmodified, similar to that of male in coloration. Total length 2.22. Carapace 1.09 long, 0.77 wide. Clypeus 0.17 high. AME diameter 0.04, ALE 0.07, PME 0.06, PLE 0.07, AME interdistance 0.36 times their diameter, AME-ALE interdistance 0.38 times ALE diameter, PME interdistance 0.60 times their diameter, PME-PLE interdistance 0.47 times PLE diameter. Sternum 0.66 long, 0.55 wide. Coxa IV interdistace 1.07 times their width. Chelicera with 5 promarginal and 5 retromarginal teeth. Tibia of leg I 3.96 times longer than deep. Tm I 0.51, Tm IV present. Number of dorsal spines on tibiae of legs I-IV: 2-2-1-1. Leg measurements: I 2.48 (0.75, 0.29, 0.59, 0.49, 0.35); II 2.36 (0.70, 0.28, 0.55, 0.47, 0.36); III 2.06 (0.61, 0.26, 0.45, 0.43, 0.31); IV 2.78 (0.78, 0.28, 0.73, 0.61, 0.39).

Dorsal plate of epigynum with 2 large linguiform scapes (Fig. 10A, B). Copulatory openings present at posterior end of linguiform scapes (Fig. 10D, E). Copulatory ducts enclosed in a sclerotized capsule, broad and wavelike at first (Fig. 10G), then continuously broadening into a pair of wide extensions with outer margin extended posteriorly (Fig. C, G), narrowing abruptly before entering into globular spermathecae (Fig. 10F, G). Fertilization ducts situated mesally (Fig. 10G).

VARIATION: 5♀ and 2♂ were measured. Total length varies from 2.08 to 2.15 in males, 2.22 to 2.45 in females. Carapace length is 0.95 to 0.98 in males, 1.09 to 1.11 in females; width 0.69 to 0.71 in males, 0.77 to 0.78 in females. The species shows intraspecific variation in the shape of dorsal plate scape (Fig. 10A, B) and the anterior part of the vulva (Fig. 10D, E).

DISTRIBUTION: Holarctic. In China it was recorded in the provinces of Hebei and Jilin (Song et al., 1999).

HABITAT. The spiders were found in the leaf litter of a birch forest and a pine forest.

Walckenaeria yunnanensis Xia, Zhang, Gao, Fei & Kim 2001 Figs 11-13

Walckenaeria yunnanensis Xia *et al.*, 2001: 163, figs 8-13.

PARATYPES: JLU, without registration number; 1♂ 6♀; China, Yunnan Province, Dali City, Hudiequan Park (25.0°N 102.7°E); collected by J. Gao; collected on 26.07.1983.

DIAGNOSIS: This species has a well-developed lamella but no tailpiece on the male palp (Figs 11A, 12D). Palpal protegulum with 2 conspicuous membranous apophyses (Fig. 11C). Distal suprategular apophysis rather robust basally, with several deep grooves on the basal inner side. Base of the embolic division unique, with 2 membraneous conspicuous apophyses (Fig. 12D). Cymbium with a large retrobasal process (Fig. 11D). In addition, the shape of female capsule, where the copulatory ducts are

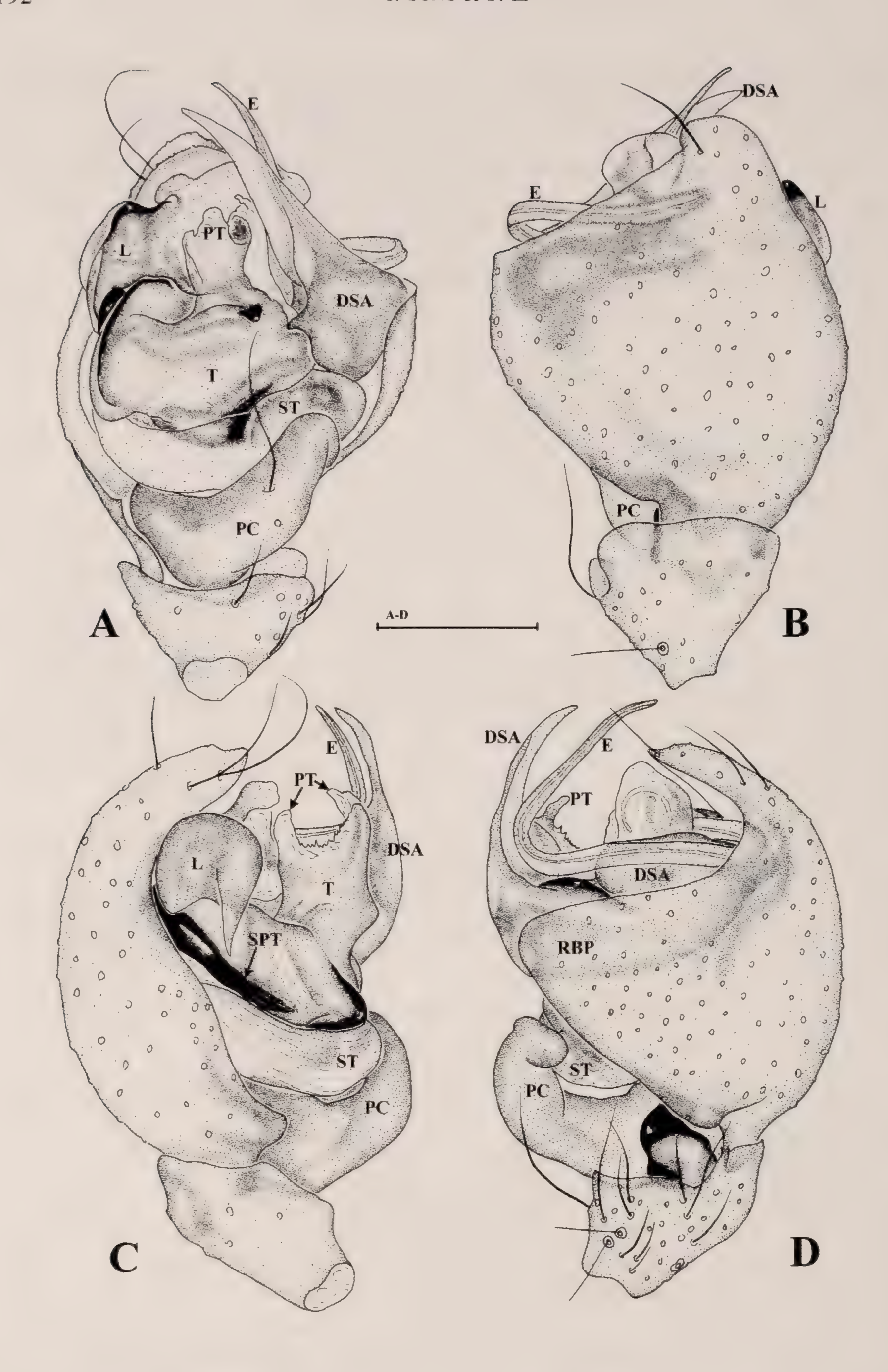


FIG. 11

Walckenaeria yunnanensis; male paratype. (A) Distal part of left palp, ventral view. (B) Same, dorsal view. (C) Same, prolateral view. (D) Same, retrolateral view. Scale lines: 0.2 mm.

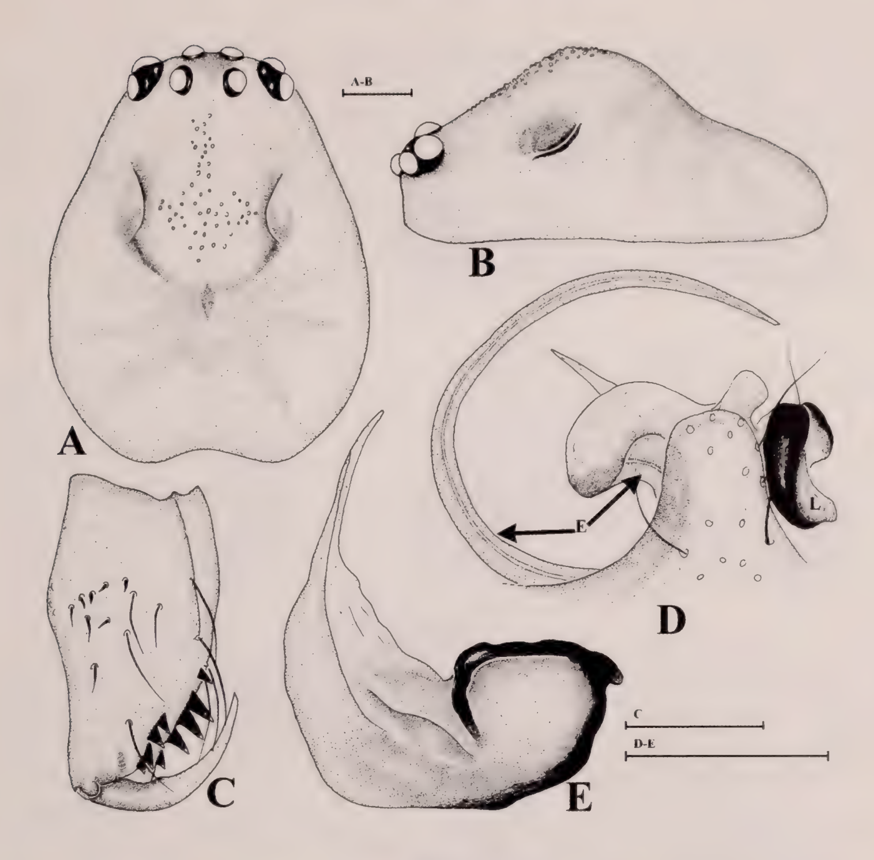


Fig. 12

Walckenaeria yunnanensis; male paratype. (A) Carapace, dorsal view. (B) Same, lateral view. (C) Left chelicera, posterior view. (D) Distal part of left palp, anterior view. (E) Distal part of suprategulum, retrolateral view. Scale lines: 0.2 mm.

embedded, is significantly different from known *Walckenaeria* species (Fig. 13A, B, F). Consequently *W. yunnanensis* can be very easily distinguished from other known *Walckenaeria* species.

Re-description of male paratype: Carapace 1.24 long, 0.96 wide, orange-brown, raised into a large hump in the middle of the thoracic part, as well as 2 shallow sulci on both sides of the hump (Fig. 12A, B). Clypeus 0.22 high. AME diameter 0.08, ALE 0.07, PME 0.08, PLE 0.08, AME interdistance 0.56 times their diameter, AME-ALE interdistance 0.62 times ALE diameter, PME interdistance 1.04 times their diameter, PME-PLE interdistance 0.35 times PLE diameter. Sternum 0.64 long, 0.64 wide. Coxa IV interdistance 1.23 times their width. Chelicera with 5 promarginal and 4 retromarginal teeth (Fig. 12C). Leg I and leg III missing. Tm IV present. Number of dorsal spines on tibia of leg IV: 2-2-1-1 (see Xia et al., 2001). Leg measurements: I missing; II 3.76 (1.13, 0.28, 0.91, 0.88, 0.57); III missing; IV 3.62 (1.06, 0.28, 0.91, 0.91, 0.45).

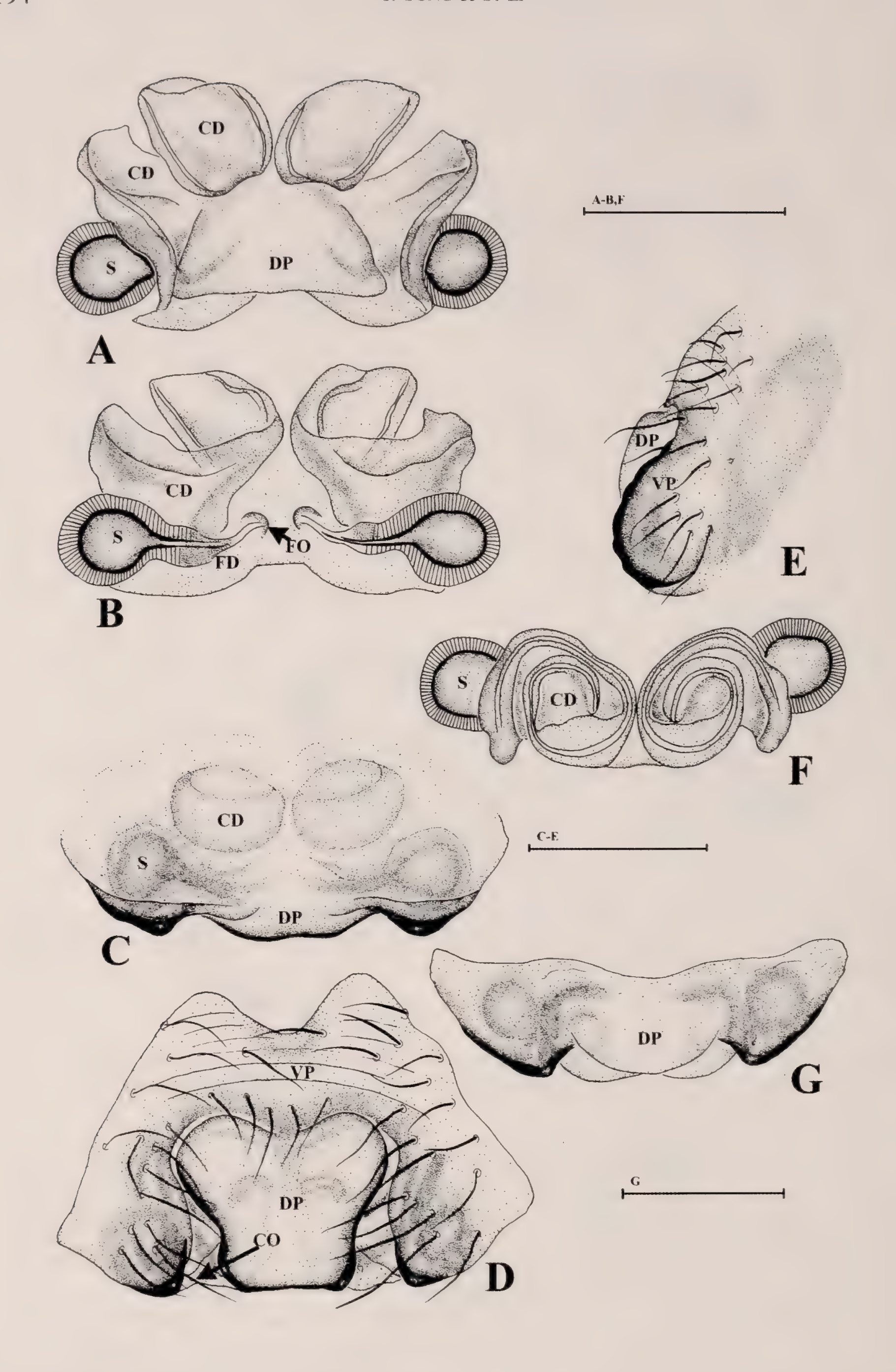


FIG. 13

Walckenaeria yunnanensis; female paratype. (A) Vulva, ventral view. (B) Same, dorsal view. (C) Epigynum, dorsal view. (D) Same, ventral view. (E) Same, lateral view. (F) Vulva, anterior view. (G) Epigynum, posterior view. Scale lines: 0.2 mm.

Palp: Tibia short, with reduced distal apophysis (Fig. 11A-D); with 1 prolateral and 2 retrolateral trichobothria (Fig. 11D). Paracymbium with strongly sclerotized black base and blunt, slightly hooked apex (Fig. 11D). Cymbium with distinct retrobasal process (Fig. 11D). Tegulum distal to subtegulum in unexpanded palp (Fig. 11A). Protegulum well developed (Fig. 11A, C). Distal suprategular apophysis robust basally and gradually narrowing towards the tip (Fig. 12E), with several deep grooves on basal inner side. Embolic division: lamella large, widened distally (Fig. 11C); base of the embolic division membraneous, with 2 conspicuous apophyses distally (Fig. 12D); tailpiece absent (Fig. 12D); embolus broad, forming a long, wide coil (Fig. 12D).

Re-description of female paratype. Carapace unmodified, similar to that of male in coloration. Carapace 1.19 long, 0.94 wide. Clypeus 0.16 high. AME diameter 0.08, ALE 0.11, PME 0.08, PLE 0.09, AME interdistance 0.32 times their diameter, AME-ALE interdistance 0.29 times ALE diameter, PME interdistance 0.81 times their diameter, PME-PLE interdistance 0.40 times PLE diameter. Sternum 0.61 long, 0.61 wide. Coxa IV interdistance 1.24 times their width. Chelicera with 4 promarginal and 5 retromarginal teeth. Tibia of leg I 8.17 times longer than deep. Tm I 0.58, Tm IV absent. Number of dorsal spines on tibia of leg IV: 2-2-1-1. Leg measurements: I 3.71 (1.09, 0.28, 0.92, 0.86, 0.56); II 3.41 (0.96, 0.28, 0.83, 0.79, 0.54); III 2.88 (0.86, 0.27, 0.62, 0.67, 0.46); IV 3.54 (1.03, 0.26, 0.88, 0.86, 0.52).

Dorsal plate totally exposed in ventral view (Fig. 13D) and a bit swollen in lateral view (Fig. 13E). Copulatory openings triangular, present between dorsal and ventral plate (Fig. 13D). Copulatory ducts enclosed in a slightly sclerotized spiral capsule (Fig. 13A, B, F). Spermathecae globular, separated from each other by a distance of more than 2 times their diameter (Fig. 13G). Fertilization ducts short, situated mesally (Fig. 13B).

Variation. 5♀ were measured. Carapace length varies from 0.91 to 1.22 and width 0.78 to 0.94.

Remark. *W. yunnanensis* occupies an isolated position within *Walckenaeria* and may need to be separated into a distinct genus when similar new species are discovered.

Distribution. Hudiequan in Yunnan Province.

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The genus *Pronura* (Collembola: Neanuridae) in South America, with descriptions of two new species and a barcode sequence for one of them

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The genus *Pronura* (Collembola: Neanuridae) in South America, with descriptions of two new species and a barcode sequence for one of them. - In this paper two new species of *Pronura* from South America are described and illustrated. *Pronura gaucheri* sp. n. from French Guyana has setae A, B, C and D of the antennofrontal setal group present; Ocp of the ocular group is absent; and a single ordinary microseta is present close to the sensilla on dorso-external tubercles of abdominal segments I-III. *Pronura paraguayana* sp. n. from Paraguay has setae A, B and D in the antennofrontal setal group (C absent); Ocp of the ocular group is present; and two ordinary setae (including one macroseta) are present in the dorso-external setal group of abdominal segments I-III. In addition to the morphological descriptions, the mitochondrial cytochrome c-oxidase subunit I COI sequence (barcode) of *Pronura gaucheri* sp. n. is provided. This the first time that a Collembola species is described along with its barcode sequence.

Keywords: French Guyana - Paraguay - Neanurinae - DNA barcoding - COI.

INTRODUCTION

To date, the genus *Pronura* comprises 53 named species (Bellinger *et al.*, 2010). All are recorded from tropical regions, but while Africa and southeast Asia host a large number of species (Cassagnau, 1996; Deharveng & Bedos, 1993), few are known from the Australian, southwestern Asian and American regions. Actually, the only South American record of the genus is *Pronura amazonica*, described from Brazil by Cassagnau & Pereira de Oliveira (1990). In this contribution, we describe two new species, one from French Guyana and the other from Paraguay. We also provide, for the first time in a taxonomic description of Collembola, the barcode for one of the new species.

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MATERIAL AND METHODS

This paper is based on material recently collected by Cyrille D'Haese during a CaFoTrop expedition in French Guyana and on material in the collections of the Muséum d'histoire naturelle de Genève. All specimens were cleared and mounted in Marc-André II or Hoyer's medium. Drawings were done with a Leica MLS2 microscope using a drawing tube.

Type material is deposited in the Muséum d'histoire naturelle de Genève (MHNG), Universidad Nacional Autonoma de Mexico (UNAM) and Muséum National d'Histoire Naturelle de Paris (MNHN).

The terminology used in the text and tables follows Palacios-Vargas & Simón-Benito (2007) (partly derived from Deharveng, 1981, 1983) and D'Haese (2003). Abbreviations: Abd. I, first abdominal segment; Ant. IV, fourth antennal segment; setal group or tubercles: De, dorso-external, Di, dorso-internal, DL, dorso-lateral, L, lateral, VL, ventro-lateral; M, long macrosetae; m, microseta; Oca, anterior ocular setae; Ocm, median ocular setae; Ocp, posterior ocular setae; s, setae s (sensorial setae); S.g.d., dorsal guard sensillum of Ant. III; S.g.v., ventral guard sensillum of Ant. III.

DNA was extracted from a 95% ethanol preserved specimen using a Qiagen DNeasy tissue extraction kit (Digestion overnight and re-suspension in 120 μl of the elution buffer). Amplification was carried out in 25μl volume reaction using Amersham Bioscience puReTaq Ready-To-Go PCR Beads. The thermocycler program consisted of an initial denaturing step at 94°C for 2 min, 5 amplification cycles with a 45°C annealing temperature (94°C for 40s, 45°C for 40s, 72°C for 1 min), 30 cycles with a 51°C annealing temperature, and a final step at 72°C for 5 min. PCR amplification and sequencing were carried out with primers designed by Cyrille D'Haese in the BoEM Lab specifically for Collembola: LCO1490col (5' – WYT CDA CWA AYC RYA ARG AYA TYG G - 3') and HCO2198col (5' – TAN ACY TCN GGR TGN CCR AAR AAT CA - 3')

RESULTS

Pronura Delamare Debouteville, 1953

TYPE SPECIES: *Pronura kilimandjarica* Delamare Debouteville, 1953

DIAGNOSIS: Neanurinae, Paleonurini. No pigment. Dorsal tubercles not or only poorly developed. Usually no reticulations nor tertiary granulations. Maxilla needle-like, mandible bidentate or tridentate. 2 + 2 unpigmented eyes, sometimes absent. Sensilla on Ant. IV subequal. Posterior tergites not fused. No cryptopygy. No additional sensorial setae on the lateral group of abdominal tergites. Di setae, at least Di1, shifted towards De on Abd. V. Tibiotarsi without tenent hairs, unguis without tooth.

Pronura gaucheri sp. n. Figs 1-7

HOLOTYPE: MNHN-EA010001 (GUY007); female on slide; French Guyana, Nouragues Field Station, Saut Pararé, 04°02.299' N, 052°40.303', W, 72 m asl; leaf litter at the bottom of a Lecitidacae, sifted and extracted in a Berlese-Tullgren apparatus; 23-IV-2009; leg. C. D'Haese.

PARATYPES: MNHN-EA010002 (GUY007), except for one paratype in MHNG and one at UNAM; three females, one male, one preadult male, four juveniles, all on slides; French Guyana, Nouragues Field Station, Saut Pararé, 4°02.299' N, 052°40.303', W, 72 m asl.; leaf litter



FIG. 1

Specimen of *Pronura gaucheri* sp. n. alive. This specimen is from the GUY038 locality and was barcoded.

at the bottom of a Lecitidacae, sifted and extracted in a Berlese-Tullgren apparatus; 23-IV-2009; leg. C. D'Haese.

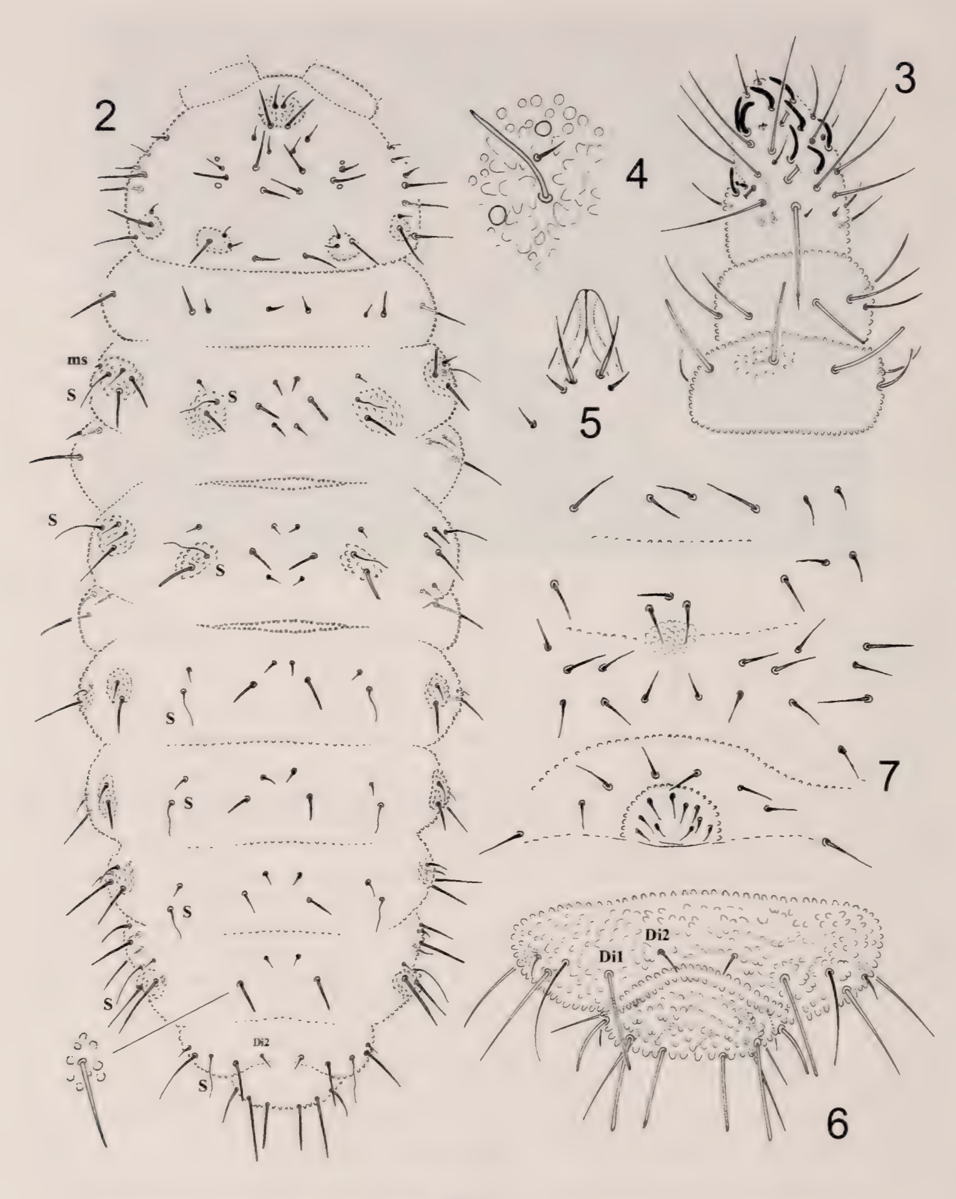
OTHER MATERIAL: GUY011, without registration numbers; 3 specimens; Saut Pararé, 4°02.293' N, 52°40.197' W, 64 m asl., dead branches and rotten log, sifted and extracted in a Berlese-Tullgren apparatus, CaFoTrop Expedition; 24-IV-2009; leg. D'Haese. – GUY035, without registration numbers; 2 specimens; French Guyana, Nouragues Field Station, Inselberg, 04°05.541' N, 052°40.646' W, 165 m asl. Leaf litter accumulation on the "plateau" at the base of the Inselberg, sifted and put on a Berlese-Tullgren apparatus CaFoTrop Expedition; 30-IV-2009; leg. D'Haese. – GUY038, 5 specimens (see Fig. 1), one voucher specimen deposited MNHN-EA010003; Inselberg. 4°05.793' N, 52°40.869' W, 407 m asl., summit forest, under bark and rotten logs, mouth aspirator, CaFoTrop Expedition; 01-V-2009; leg. D'Haese.

ETYMOLOGY: This new species is cordially dedicated to Philippe Gaucher, director of the Nouragues Field Station (CNRS-Guyane).

DIAGNOSIS: Head dorsally with seta C present, seta E absent and Ocp absent. One macroseta on De tubercles of Th. II-III, none on De of Abd. I-IV.

DESCRIPTION: Length (n = 4 adults) 0.59-0.94 mm. Color, white alive (Fig. 1). Secondary granules coarse; no tertiary granulation; tubercles indicated by coarser secondary granules, often hardly distinct on head, stronger but weak on De and DL of Th. II-III, and well developed on DL from Abd. I to III. Three kinds of ordinary dorsal setae: large smooth macrosetae being blunt apically and finely sheathed (M), medium-size smooth setae with blunt tips (mesosetae) and acuminate microsetae (m). Sensorial setae (s) long and thin, subequal or slightly longer than closest macrosetae (Fig. 2).

Ant. I with 7 setae, Ant. II with 11 setae. Ant. III sensorial organ with two globular sensilla in a cuticular fold, and two guard sensilla. S.g.v. almost straight and



FIGS 2-7

Pronura gaucheri sp. n., female holotype. (2) Dorsal chaetotaxy. (3) Antennal segments I-IV in dorsal view. (4) Left ocular area. (5) Labrum. (6) Abdominal tergites V and VI. (7) Chaetotaxy of abdominal sternites II-V.

bigger than s.g.d.; one ventro-external microsensillum. Ant. IV with 8 subequal sensilla (Fig. 3), twelve long and finely blunt setae (mou), one short acuminate seta (i) and a small subapical organ. No apical bulb differentiated.

Head with 6 indistinctly or very weakly delimited tubercles, marked by larger secondary granulation, its chaetotaxy as in Fig. 2. Eyes 2 + 2, unpigmented, very small, of same size as surrounding secondary granules (Fig. 4). Mandibles bidentate, maxillae styletiform. Labrum elongate, rounded apically (Fig. 5). Labrum formula ?0/2,4. Labium with 4 basal, 3 distal and 3 lateral setae, without conspicuous x-papillae, typical for most Neanurinae (e.g. fig. 4D in D'Haese, 2003). Five setae Vi on ventral side of head.

Tergite chaetotaxy as in Figs. 2 and Table 1. Abd. VI unilobed, with a single uneven, poorly differenciated tubercle (Fig. 6).

TABLE 1. Dorsal chaetotaxy of *Pronura gaucheri* sp. n.; tubercles inconspicuous on head. Setae number by setal groups.

A-Head chaetotaxy (by setal group)

Head setae group	Tubercles	Number of setae	Kind of setae	Setae
Cl+Af+Oc	±	16	8M, 8m	A, B, C, D, F,G, Oca, Ocm
Di	-	1	M	Di1
De	±	3	M, 2m	De1, Di2, De2
DL	±	3	2M, m	uncertain homologies
L+So	-	3	2M, 1m	uncertain homologies

B-Tergite chaetotaxy (by setal group on half tergites)

Thorax	DI	De	DL	L
I	me	M, m	M	-
II	M, 2m	M, m + s	2M, m + s + ms	M, 2m
III	M, 2m	M, m + s	M, 2m + s	M, 2m
Abdomen				
I	M, m	m + s	M, m	M, m
II	M, m	m + s	M, m	M, m
III	M, m	m + s	M, m	M, m
IV	M, m	2M, m + s		2M, 2 m
V		3M, 2m + s*		m
VI		(7+7)		

* Di2 mesoseta, not shift laterally, but clearly part of a (Di+De+DL) tubercle

Number of setae on legs I, II and III: tibiotarsi: 18, 18 and 17 (M absent); femora: 12-13, 11-12, 10; trochanters: 5, 5, 5; coxae: 3, 7, 8; subcoxae 2: 0, 1, 1. Unguis without tooth.

Ventral tube with 4 + 4 setae. Furcal vestige with 3 setae and no microseta (Fig. 7). Female genital plate with 3 + 3 pregenital, 8 circumgenital and 2 eugenital setae (Fig. 7). Male genital plate with 3 + 3 pregenital, 5 circumgenital and 4 + 4 eugenital setae. Anal lobes with 10-11 setae Ve; 2 microsetae An on each anal valve. No modified ventral setae in male.

TAXONOMIC REMARKS: *Pronura gaucheri* sp. n. is close to *P. amazonica*, the only species of the genus previously known from South America. *P. gaucheri* sp. n. differs mostly by the absence of macroseta De1 on Abd. I-III, tubercle (De+DL) posterior (versus internal) to L on Abd. IV, and 1 anterior mesoseta (versus 2) between axis and

sensilla of Abd. V. This last feature is also observed in the genus *Paramanura* Cassagnau, 1986, which includes a South-American species (*P. najtae* Cassagnau, 1986 from Venezuela, type species of the genus) and a Nepalese species (*P. problematica* Cassagnau, 1991). *P. gaucheri* differs from *Paramanura* taxa by the seta Di2 present and not shifted laterally on Abd. V, and by the dorso-external sensilla included in the (De+DL) tubercle of Abd. IV. The validity of the genus *Paramanura* has been questioned by Cassagnau himself (1991), and will be the subject of a further paper.

DNA BARCODE: A 658bp fragment of the COI gene has been amplified and sequenced from a specimen (Fig. 1) of the GUY038 locality. The sequence has been deposited into the Barcode of Life Database (BOLD) under accession number CDHO001-10 and in GenBank under the accession number JF411069.

Pronura paraguayana sp. n. Figs 8-14

HOLOTYPE: MHNG, without registration number; female on slide; Paraguay, Provincia Caaguazu. Río Yujury, 17 km south of Yhu, sifting in tropical dry forest; 9-IV-1985; leg. expédition zoologique du Muséum de Genève.

PARATYPES: MHNG, except for one paratype male in UNAM and one paratype female in MNHNP, without registration numbers; three females, two males, one preadult female, one juvenile, all on slides; collected together with the holotype.

OTHER MATERIAL: MHNG, without registration numbers; one female, three juvenils; Paraguay, Provincia Caaguazu, 20 km north of Coronel Oviedo (10 km south of Carayou), sifting of litter and dead trunks; 9-IV-1985; leg. expédition zoologique du Muséum de Genève.

ETYMOLOGY: The species name refers to the country of origin of the specimens examined (Paraguay).

DIAGNOSIS: Head dorsally with C absent, E absent and Ocp present. Two macrosetae (Th. II-III) and one macroseta (Abd. I-IV) on De tubercles of tergites.

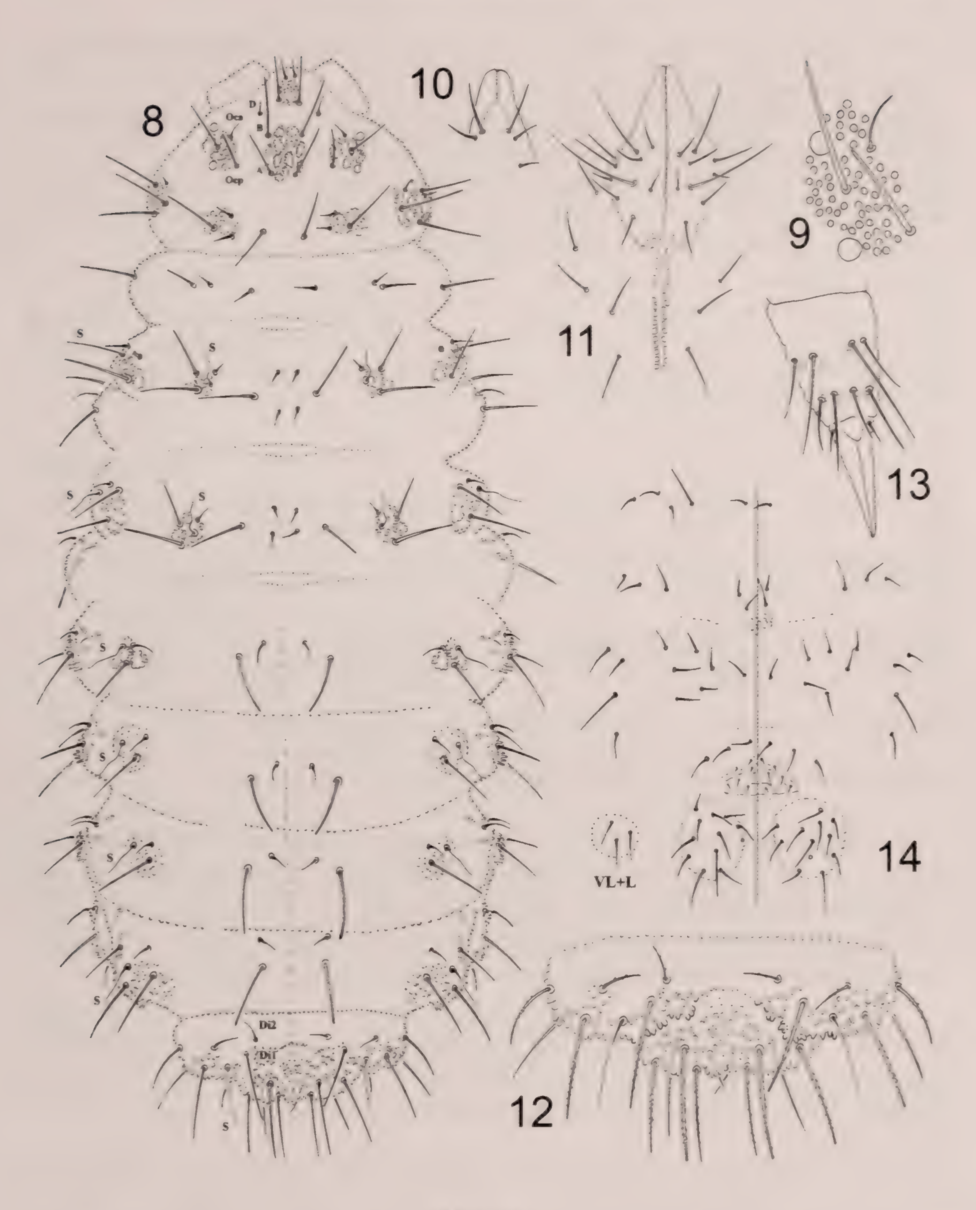
DESCRIPTION: Length (n = 6 adults) 0.76-1.08 mm. Color white. Granulation of the body fine, stronger on tubercles, these also indicated by tertiary granulation, mainly laterally and on Abd. V-VI. Tubercles De and DL developed, Di not developed from head to Abd. IV; tubercles of Abd. V-VI strongly developed. Two kinds of ordinary dorsal setae: thick, slightly barbulate macrosetae (M) and shorter, thinner, more bent and less barbulate microsetae (m). Sensorial setae (s) long and thin (Fig. 8).

Ant. I with 7 setae, Ant. II with probably 11 setae, the dorsal ones thicker and longer than the ventral ones. Ant. III sensorial organ with two globular sensilla in a cuticular fold, and two guard sensilla. S.g.v. almost straight and longer than S.g.d.; one ventral microsensillum. Ant. IV with 8 subequal sensilla, twelve long and finely blunt setae (mou), one short acuminate seta (i) and a small subapical organ. No apical bulb differentiated.

Eyes 2 + 2, unpigmented, large (diameter three times that of surrounding secondary granules) (Fig. 9). Mandibles with 2 teeth, maxillae styliform. Head without well-developed tubercles. Labrum elongate, rounded apically (Fig. 10). Labrum formula ?/2,4. Labium with 4 basal, 3 distal and 3 lateral setae, without conspicuous x-papilla (Fig. 11).

Five cephalic tubercles (Table 2). Head chaetotaxy as in Fig. 8. Seta D free.

Tergite chaetotaxy as in Fig. 8 and Table 2. Tubercles of Abd. VI fused in a single, well differentiated tubercle (Fig. 12).



FIGS 8-14

Pronura paraguayana sp. n., female holotype. (8) Dorsal chaetotaxy. (9) Left ocular area. (10) Labrum. (11) Labium. (12) Abdominal segments V and VI. (13) Tibiotarsus of leg II in ventral view. (14) Chaetotaxy of abdominal sternites II-VI (group of setae VL+L surrounded with dotted line).

Number of setae on legs I, II and III: tibiotarsi: 18, 18 and 17 (M absent, Fig. 13); femora: ?12, ?, ?; trochanters: 6, 6, 6; coxae: 3, 7, 8; subcoxae 2: 0, 2, 2. Unguis without tooth. Tibiotarsi without tenent hairs (Fig. 13).

TABLE 2. Dorsal chaetotaxy of *Pronura paraguayana* sp. n. Setae number by setal groups.

A-Head chaetotaxy

Head setae group	Tubercles	Number of setae	Kind of setae	Setae
Cl	+	4	M, m	FG
Af	+	4	M	AB
	-	2	M	D
Oc	+	3	M	Oca, Ocm, Ocp
Di	-	1	M	Di1
De	+	3	M, m	De1, Di2, De2
DL+L+So	+	12	5M, 7m	uncertain homologies

B-Tergite chaetotaxy (by setal group on half tergites)

Thorax	DI	De	DL	L
I	M	M, m	M	-
II	M, 2m	2M, m + s	2M, m + s + ms	M, 2m
III	M, 2m	2M, m + s	2M, m + s	M, 2m
Abdomen				
I	M, m	M, m +s	M, m	M, 2m
II	M, m	M, m +s	M, m	M, 2m
III	M, m	M, m +s	M, m	M, 2m
IV	M, m	3M, m + s		5M, m
V		4M, 2m + s*		3m**
VI		(7+7)		

* Di2 mesoseta, shift laterally; ** including VL

Ventral tube with 4 + 4 setae. Furcal vestige with 4 setae and no microseta (Fig. 14). Female genital plate with 3+3 pregenital setae, 11-14 circumgenital setae and 2 eugenital setae (Fig. 14). Male genital plate with 3 + 3 pregenital setae, 10-12 circumgenital setae and 4 + 4 eugenital setae. Anal lobes with 12-13 setae Ve (Fig. 14); 2 microsetae An on each anal valve. No modified ventral setae in male.

TAXONOMIC REMARKS: *Pronura paraguayana* sp. n. differs from the other American species, *P. amazonica* and *P. gaucheri* sp. n., by different chaetotaxic characters (see Table 3), and by the morphology of its macrosetae (barbulate and of relatively longer size versus smooth and rather short).

TABLE 3. Comparative table of South-American species of *Pronura* and *Paramanura*

	Af	Oc	De Th. II-III	De Abd. I-III	De+DL Abd IV	L Abd I-II
P. amazonica	ABCD	Oca, Ocm	2+S	2+S	3+S	2
P. gaucheri	ABCD	Oca, Ocm	2+S	1+S	3+S	2
P. paraguayana	ABD	Oca, Ocm, Ocp	3+S	2+S	4+S	3
Paramanura najtae	ABD	Oca, Ocm	2+S	1+S	4+S	2

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